

# **Machinery**

and production engineering

**VOLUME 110**

**January to June, 1967**

**THE MACHINERY PUBLISHING COMPANY, LTD.**

*Editorial Office:*

**CLIFTON HOUSE, 83-117 EUSTON ROAD, LONDON, N.W.1**

Telephone: EUSton 8441 (4 lines) Telegrams: Machtool, London, N.W.1

*Head Office:*

**NEW ENGLAND HOUSE, NEW ENGLAND STREET, BRIGHTON BN1 4HN**

Telephone: Brighton 61334 (4 lines) Telegrams: Machtool, Brighton

# INDEX TO MACHINERY

## VOLUME 110

A	PAGE		PAGE		PAGE
AEG-Elotherm G.m.b.H.:		Air pallet Clark . . . . .	1274	Archibald, F.R.:	
20-kW induction heating equipment for		Aircworth 200-ton hot and cold bar shear-		Design of alignment test bars . . . . .	1061,1278
heat-treating welded joints in pipelines . .	999	ing machine . . . . .	846	Arcuate surface, Determining the radius	
A.E.G. (Gt.Britain), Ltd. . . . .	1084	Airflow and Coolair buffs and mops . . . .	602	of an, with the aid of a measuring	
A.E.G. Numeric 311 continuous-path con-		Airmec, Ltd.: . . . . .		microscope . . . . .	520
trol equipment on Schehr lathe . . . . .	1084	Autoset n.c. system applied to existing		Armco-Pittsburg S.A.: . . . . .	
AEI-Birlec, Ltd.: . . . . .		machines . . . . .	528	Copper-coated steel strip . . . . .	295
Electro-slag refining equipment installed		Autoset 410 n.c. systems on Gate-		Armshire Reinforced Plastics, Ltd.: . . . .	
at Hall & Pickles works . . . . .	483	Omega No.2 jig borer . . . . .	267,885	Glass-fibre reinforced plastics components	
A.E.I. (see Associated Electrical Industries,		Numerically Controlled Machine Tool Centre	951	produced by cold pressing . . . . .	737
Ltd.) . . . . .		Akron Standard Mould Co.: . . . .		Armstrong, Stevens & Son, Ltd.: . . . .	
AGIE Co.: . . . . .		Eliminating breakage of small drills . .	136	Examples of high energy rate forging on a	
Newall-AGIE type 1520-75K jig		Alapayevsky type 1425 chucking auto-		Dynapak machine . . . . .	1147
erosion machine . . . . .	663,834	matic . . . . .	312	Aro Company: . . . . .	
A.I. Welders, Ltd.: . . . . .		Aldridge Tool & Engineering Co., Ltd.: .		Fluid logic control equipment on Czech	
Roller Shear system for strip and plate		Smart & Brown-Aldridge contour		eccentric press . . . . .	1377
processing lines . . . . .	865	cutting grinder set up for sharpening		Pneumatic logic system . . . . .	821
AMAC, Ltd.: . . . . .		a form milling cutter . . . . .	325	Assembly, automated, The significance of .	34
Producing and controlling a critical die		Alexander, George H., Machinery Ltd.: .		Assembly benches, Randalrak work . . . .	1332
casting . . . . .	709	1 : 1 hand duplicator . . . . .	694	Assembly of British-built Milwaukee-Matics.	
A.P.T. Electronic Industries, Ltd. . . . .	151	See also . . . . .	533,944	Clean room for . . . . .	1309
A.R.O. Machinery Co., Ltd.: . . . . .		Alexander, George H. Machinery (Man-		Assembly of Churchill CA9-10 and BA60	
Type 527 air-operated portable spot		chester), Ltd.: . . . . .		automatics . . . . .	1254
welding gun . . . . .	870	Exhibits at Yorkshire E.L.A. Exhibition	822	Assembly line, The new Ford door . . . .	508
ASCO alphatizing process . . . . .	970	Triple Twelve bandsaw . . . . .	823	Assembly machine for cylinder heads . . .	
A.T.A. (Grinding Processes), Ltd. . . . .	201,403	See also . . . . .	944	Russian automatic . . . . .	456
Abrasion-resistant material, "Plastic Carbide"		Alexandra Engineering (Southend), Ltd.: .		Assembly machine for piston/connecting rod	
Abrasive belts, Behr-Manning diamond . . .	40,1188	Badalex vacuum flask installation . . . .	1306	units, Russian automatic . . . . .	456
Abrasive Developments, Ltd.: . . . . .		Alfa-Laval Co., Ltd.: . . . . .		Assembly machine for sewing machine needle	
The MicroBlast process . . . . .	21	Clean-oil installation at BMC . . . . .	89	clamp units, Russian automatic . . . . .	1127
Abrasive discs, Piferd Plus reinforced . . .	403	Alignment test bars, Design of . . . . .	1061,1278	Assembly, Progress in automated . . . .	152
Abrasive machining, High-precision . . . .	466	All-Union Centre of Industrial Design.		Assembly, Prospects for automatic . . . .	99
Abrasive machining, Precision casting for		Russian . . . . .	907	Assembly shop at the Ordjonikidze Machine	
Abrasive-wheel cutting-off machine, Curley .	474	Allen, W.H., Sons & Co., Ltd.: . . . . .		Tool Works, New . . . . .	904
Abrasive-wheel cutting-off machine, MMT . .	1262	Set-ups on Schiess gear shaper for cut-		Assembly technique for BSA motor cycles.	
Abwood Machine Tools, Ltd.: . . . . .		ting teeth in the coupling ring of Allen-		Advanced . . . . .	1038
Abwood-Contelyt electrolytic surface		Stockicht epicyclic gear . . . . .	946	Assembly technique for printed-circuit board	
grinders . . . . .	832	Allis-Chalmers Manufacturing Engineering		units, A modular . . . . .	1136
Type ASG-1 Mk. 11 vertical-spindle sur-		Dept.: . . . . .		Assembly unit, R.E.M. screw feed and . .	1108
face grinder . . . . .	144	Productivity and profits increased with		Assembly, Work handling equipment for	
Accounting machines, High-precision mach-		n.c. chucking automatics . . . . .	85	I.C. engine . . . . .	794
ing of components for . . . . .	466	Alphatizing and bright chromizing . . . .	970	Associated Electrical Industries, Ltd.: . .	
Accuratool automatic capstan lathe set up		Aluminium Laboratories, Ltd.: . . . . .		Control system for modern flying shears	
for producing blanks . . . . .	1383	Installation of Monometer lip-axis tilting		Astral Engineers, Ltd.: . . . . .	743
Accuratool 1-in. automatic capstan lathe		reverberatory furnace . . . . .	518	Some current development in electro-	
Accupede motor speed control system . . .	693	Aluminium melting in bulk . . . . .	517	forming . . . . .	732
Borg-Warner . . . . .	1097	Amendola Engineering, Ltd.: . . . . .		Atkin combined coil cradles and strip	
Acid resisting steel, EWC . . . . .	1434	Machine for cropping forgings from bar	476	straighteners . . . . .	299
Acramatic IV numerical control system . .	1036	American Machine & Foundry Co.: . . . .		Atlas Copco (Gt. Britain), Ltd.: . . . .	
Actuator, Limitorque Zero Four electric valve	70	Licence agreement for manufacture of		Impact tool for loosening and tightening	
Accuratool automatic capstan lathe set up		the Versatran in the U.K. . . . .	216	nuts . . . . .	1405
Adcock & Shipley, Ltd.: . . . . .	708	Versatran continuous-path industrial		Atomic Energy Research Establishment:	
Bolts, clamps and T-nuts for British-built		robots . . . . .	179	Workshop Analysis and Scheduling	
Bridgeport milling machines . . . . .	45	Amplifier, turbulence, for fluid logic		Programme . . . . .	128
Centralized lubrication for A & S milling		control equipment, New Maxam . . . .	40	Ceramics Divn.: . . . .	
machines . . . . .	686	Anchors, Phillips expanding stud . . . .	1408	Ultrasonic machining equipment . . . .	749
Optical measuring equipment for Bridge-		Anderton Springs, Ltd.: . . . . .		Audio-visual system for instruction of	
port machines . . . . .	797	Exhibits at London International Engng.		production line workers . . . . .	1194
Type 1E-AH auto-cycle horizontal milling		and Marine Exhibition . . . . .	862	Aurelio Merli: . . . . .	
machine . . . . .	573	Andrews, W.R., (Engineers), Ltd.: . . . .	142	Clover centre lathes . . . . .	1049
Adcock & Shipley (Sales), Ltd. . . . .	255,797	Work clamp . . . . .	989	Australian Defence Scientific Service:	
Adept dry film lubricant, Duckhams . . . .	1151	Angle checking to 1 min. of arc Shop . .		Measurement of line straightness . . . .	591
Adformax E.P. tapping compound . . . . .	260	floor . . . . .	989	Australian Zinc Alloy Die Casters Association	
Advisory service for industrial training . .	1261	Angle planning equipment for Boehringer		Annual Convention . . . . .	1425
Aeroplane & Motor Aluminium Castings, Ltd.:		planing machines . . . . .	1252	Auto-cycle milling, High-speed . . . . .	573
Producing and controlling a critical die		Anglo-metric micrometers, New Shardlow	147	Auto-Robot control for Herbert No. 0 capstan	750
casting . . . . .	709	Annunciators and monitors, Panalarm		Autobot Co.: . . . . .	
Aerospace components, Large capacity		Series 70 . . . . .	650	AMF Versatran Divn.: . . . .	
electrochemical machine for operations on		Anocut equipment for high-volume		Industrial robots . . . . .	179
Agemaspark, Ltd.: . . . . .	1417	production . . . . .	326	Automated assembly, Progress in . . . .	152
Type F 400 spark erosion machine . . . .	883	Anodizing and selective treatment of		Automated assembly, The significance of .	115
Alcol Rotamill indexing fixture, Demonstra-		metal surfaces, Selectron equipment for	408	Automated hot forging installation . . . .	253
tion of . . . . .	1385	Applied Electronics & Automation, Ltd.:		Automatic assembly, Economics of . . . .	152
Air Automation, Ltd.: . . . . .		Mains distribution unit . . . . .	127	Automatic assembly machine for cylinder	
New control valves . . . . .	1372	Apprentice training centre at the works of		heads, Russian . . . . .	456
Type D600 vice and air/hydraulic in-		Ashdown Bros. . . . .	608	Automatic assembly machine for piston/	
tensifier unit . . . . .	1050	"Approaching Automation" advisory centre	658	connecting rod units, Russian . . . . .	456
Air-bearing developments . . . . .	1200	"Approaching Automation" exhibition at		Automatic assembly machine for sewing	
Air compressor production at the works of		Birmingham University . . . . .	1162	machine needle clamp units, Russian . .	1127
Claydon Dewandre, Developments in . . .	172	Aquicut Super 10 cutting oil . . . . .	247		
Air cylinders, Baldwin position-controlled .	72	Arbor press with percussion ram . . . .	818		
Air cylinders, Schrader aluminium . . . . .	263	Arboreus wheels, Grinding at very high			
Air heater, Cronack . . . . .	327	speeds with . . . . .	65		
Air and hydraulic cylinders with built-in limit		Archdale, James & Co., Ltd.: . . . . .			
switches, Tomkins-Johnson . . . . .	36	Drilling machines incorporated in auto-			
Air line pressure, Equipment for boosting .	742	matic girder drilling installation . . . .	265		
Air-operated toggle press, Red Ring . . . .	1163	Economics of automatic assembly . . . .	153		
Air-operated tube bending machine, Carver	1376	Economics of mechanical assembly . . . .	152		



	PAGE		PAGE		PAGE
Billet cutting-off and die splitting		Boring machine. Heald Bore-Matic type 622A		British Productivity Council:	
band-sawing machine. Havart	806	horizontal	1048	New films	440
Billet drilling machine. Craven transportable	98	Boring machine. Makino MCP-70 n.c.		British Ropes, Ltd.:	
Billet piercing technique. New 3-roll	258	horizontal	811	Film: A world of wire	1284
Billet sawing machine. Wessex	691	Boring machine. Russian prototype numerical-		British Rototherm Co., Ltd.:	
Blimax type TA.50 circular sawing machine		ly-controlled	229	4-in. dial bi-metal thermometer	917
with bar feed unit	97	Boring machine. Stuart Davis special duplex	39	British Scientific Instrument Research	
Binary to decimal converter. Marconi		Boring machine. TOS-Kurim type WIS 63		Association:	
pneumatic tape reader and associated	1199	multi-spindle fine	640	Electrophoretic forming of ceramic	
Binns & Berry Bros. (Halifax) Ltd.:		Boring machine. Wyveric turning, facing and	261	components	1424
Tangram machine tool units	349	Boring machines. Shurtliff special-purpose	119	New form of hot-rod diameter gauge	1299
Birch, Michael H., (Designs), Ltd.:		Boring and milling machine. Kuraki type		System for automatic inspection of blanks	748
Use of Flexane for lining tumbler barrels	64	KBT-602 horizontal	298	British Standards Institution:	
Birchington Engineering Co., Ltd.:		Boring and milling machine. Schwabische		Interim coding table for numerical control	
Production of small precision parts from		Huttenwerke type SHW-UF 3B horizontal,		of machine tools	1114
cold drawn sections	620	with punched-card programme control	1270	Briviskop hardness testing machines.	
Bird, Frank:		Boring and milling machines. Czech type W9		Reichert	807
Producing large radius grooves with a		horizontal, of unit construction	639	Broach, Russian MP-188 automatic bearing	82
smaller cutter	625	Boring and milling machines. Pegard	18	Broaching machine, Weatherley Cincinnati	
Birkett, Francis W., & Sons, Ltd.:		Boring, milling, drilling and facing machine.		automatic, for operations on rocker shaft	
Cutmaster-Stone type N160 cutting-off		New Richards horizontal	321	components	755
machine	913	Boring tools. Improved support pad arrange-		Broaching machines. Colonial Uni-Slide series	
Birmingham Industrial Safety Centre.		ment for	523	SD pull-down	17
Presentation of 20-ton power press with		Boring with ceramic tools in compensating		Bronx Engineering Co., Ltd.:	
safety guard to	809	spindles	1314	High-speed tube straightening machine	15
Birmingham University:		Boulton Paul Aircraft:		50-ton hydraulic press	20
Application of a Petro-Forge machine to		Linear transducers	301	1000-ton hydraulic press brake	532
high-speed shearing operations	274	Boulton & Paul, Ltd.:		Large plate bending rolls	249
Bishop, Eaves & Sons, Ltd.:		Automatic girder drilling installation at		Roll straightening machine installed at	
Workmaster turret head machine with		works of International Steel Co., U.S.A.	265	Chesterfield Tube Co.	828
automatic positioning table	410	Boxmoor Machine Tools, Ltd.	475	Brookes (Oldbury), Ltd.:	
Bjerche, Alf:		Bradbury Controls, Ltd.:		Brooks, Billet grinding and forging	614
Oxan oil floor lacquer	1005	Speedram compound cylinder	31	Brookhurst Ignatic, Ltd.:	
Blank-handling equipment for heavy presses	963	Bradley, G. & M., Ltd.:		Limit switching unit	531
Blanks. Accuratool automatic capstan lathe		Application of lasers to distance measure-	1369	Thermistor control system	421
set up for producing	1383	ment		Brookman, R.S., Ltd.:	
Blanks. Ferro-Tic. Large isostatic press for		Brake motors. Crompton-Dupar small	1159	Selffeed feed cylinders incorporated in	
the production of	986	Brake shoes. Bliss 1000-ton coining press for	95	Westwind Turbines drilling units	91
Blanking, fine, facilities at the works of		Braking systems. Production of air com-		Selffeed air-operated drilling and	
Mycroshims. Improved	1095	pressors for vehicle	172	tapping units	862
Blanking press. Cowlishaw Walker 600-ton	1295	Brammer V-Link Belting, Ltd.:		Broom & Wade, Ltd.:	
Blanking presses. Extended range of Fine-O-		Wedglink belting	1209	Broomatic machine for drilling and	
Matic fine	522	Branson Instruments, Inc.:		tapping brass collars	950
Blast rooms. Vacu-Blast glass bead	257	Probe for testing hardness of gear teeth	1106	Self-feed units of double-spindle tool	857
Blastforming process for improving properties		Brass collars. Broomatic drilling and tapping		Special screwdriver for Avdel assembly tool	381
of high-speed steel	481	machine for	950	Broomfield Engineering Co., Ltd.:	
Blasting equipment. Roto-Finish Osroblast wet	469	Brazing torch. Dewrance Mark 3.	918	Par-Square measuring equipment	825
Blasting machine, Grit, for automatic		Breakage of small drills. Eliminating.	136	Broughton, J., & Son (Engineers) Ltd.	23
removal of flash from plastics parts	76	Brecknell, Willis & Co., Ltd.:		Brown Boveri programme control system on	
Blasting equipment. Microblast miniaturized		Activities of the company	1439	Werner vertical-spindle milling machine	491
processing and	21	"Bridge into Europe". Churchill's	766	Brown, David, Gear Industries, Ltd.:	
Blasting. Shot, plant for machine tool castings	798	Bridgeport machines. British-built optical		Automatic induction hardening machine	
Blechbearbeitungsmaschinenwerk, VEB:		measuring equipment for	797	for large gears	888
Plate straightening machine	995	Bridgeport machines. Multiple-drilling of		Computer-designed gear units	432
Blind captive nuts. I.F.A.C.	34	impellers on	255	Gearbox test rig	796
Bliss, E.W., (England), Ltd.:		Bridgeport milling machines. Bolts, clamps		Large capacity gear hobbing machine	1328
1000-ton coining press for brake shoes	95	and T-nuts for British-built	45	Brown & Sharpe, Ltd.:	
See also	535	Brierley, Z., (E.T.S.) Ltd.:		Mini-16 automatic screw machine	1380
Boat hull, Reinforced plastics, produced by		Mark III drill grinders	1098	Brown & Tawse, Ltd.:	
cold pressing	739	Brightside Foundry & Engng. Co., Ltd.:		Savings obtained with a SADIE invoicing	1206,1332
Boehringer, Gehr:		Installation of highly-mechanized inspection		computer	
Angl: planing equipment for planing		and descaling lines in a steelworks	758	Brunner Machine Tools, Ltd.	97,697
Boeing Airplane Co.:		Brisch, E.G., & Partners Ltd.:		Brushing. Deburring condenser plates by	134
Direct computer control of machine tools	493	Group Technology Symposium	653	Buck & Hickman, Ltd.:	
Bohner & Kohle:		Bristol Aerojet, Ltd.:		Dinner for retiring members of staff	46
Boko WF 2 bed-type toolroom milling		Electrodeposited composite materials	889	New Jones & Lamson film	819
and boring machine	1321	British Aero Components, Ltd.:		See also	1380
Bolt pointing machine. Greenwood & Batley		Some aspects of bush production	4	Bufis and mops. 3M Airflow and Coolair	602
automatic.	825	Precision roundness measuring table		Buhler Bros.:	
Bolts, clamps and T-nuts for Adcock & Shipley		British Aircraft Corporation (Operating), Ltd.:		New 160-D die casting machines with	
machines	45	Design and manufacture of pure fluid		direct injection system	1431
Bonella, D.H., & Son Ltd.	541	logic elements	485	Buhr Machine Tool Co.:	
Boosting factory air line pressure. Equipment		British Ernsto Corporation, Ltd.:		Transfer lines for the production of	
for	742	Exhibits at London International		pump components for an exhaust gas	
Booth, James, Aluminium Ltd.:		Engineering and Marine Exhibition	856	control system	542
Aluminium-magnesium-silicon alloy for		British Export Marketing Advisory Committee:		Bulk, J.:	
busbar applications	1416	Report on the USA market	1167	The application of fluidics in the numerical	
Boothey, S.W.:		British Federal Welder & Machine Co., Ltd.:		control of machine tools	802
Measurement of line straightness	591	D.C. seam welding machine	867	Bumpers. Improved corrosion resistance of	
Bore and face grinding machine. Spandau		Timer for welding applications	102	Dur-Ni treated	1301
Lindner type SJB 35	1270	British Industrial Gases, Ltd.:		Bunker-Ramo n.c. equipment, Application of,	
Bore gauge and Carb-O-Grip chuck jaw		Exhibits at International Welding Exhibition	867	to existing machines	524
inserts. Rok-It spherical	248	British Industrial Plastics, Ltd.:		Burghelm, Julius H., BETEMA Maschinen-	
Bore-Matic type 622A horizontal boring		Film: A plus for plastics	1115	fabrik:	
machine. Heald	1048	British Iron and Steel Research Association:		Compacting presses for metal powder	588
Bores of V-type cylinder blocks. Micromatic		Electrodeposited composite materials	476	Burgsmüller type HW-1 internal-thread whirling	
machine for checking	19	50-ton load cell	1200	attachment	149
Bores. Roller burnishing in differential		Semi-automatic fine wire welding machine	1305	Burnett Machine Tool Co., Ltd.:	
warning switch bodies	1023	Spray steelmaking process	137	Granville Star 4-in. centre lathe	824
Boremasters of Kenilworth Ltd.:		British machine tool export prospects to		Burnishing bores in differential warning switch	
Production of master cams	1360	Canada	647	bodies. Roller	1023
Borg-Warner, Ltd.:		British Motor Corporation:		Burnishing machine. Cogsdill flat surface roll	474
Accupace motor speed control system	1097	Alfa-Laval clean-oil installation	89	Burrmaster machine for deburring bar material	
Boring and facing heads. D'Andrea	96	British Numerical Control Society:		and tubing	994
Boring distributor caps. Meddings machine for	149	One-day conference	1276	Burton, Griffiths & Co., Ltd.	698
Boring machine. Giddings & Lewis Fraser		British Oxygen Co., Ltd.:		Busbar chambers. Aluminium	1416
Hybormill type 70 a numerically-controlled	876	Bantam 3 portable oxygen cutting machine	870	Busbush production. Some aspects of, at the works	
		Use of Roccol soluble oil facilitates		of British Aero Components	4
		machining operations	519		



Butler Machine Tool Co., Ltd.: "General service" shapers . . . . .	1263
Bux electromagnetic base portable drills . . . . .	201
Bydro rotary shaft oil seals . . . . .	974,1116

# C

C.E.M.B. dynamic balancing machine. Large . . . . .	530
C.Z. Scientific Instruments, Ltd.: Zeiss metrology symposium . . . . .	357
Cable, Cutting flexible, accurately to preset lengths . . . . .	377
Cables, transmission, for the IBM System/360 computer. Simulating on a computer the tooling up process for production of Calculator for conversions between inches and millimetres. Feams . . . . .	631
Calibration machine for Delft Laboratory . . . . .	1418
Cam Gears, Ltd.: Machining operations on rocker shaft components . . . . .	240
Cam inspection machine. Taylor Hobson automatic . . . . .	752
Cam milling machine. Philips numerically-controlled . . . . .	1361
Cam-Set toolholder. Herbert-BSA . . . . .	187
Cams, Manufacture of, from cold drawn sections . . . . .	550
Cams, master, Production of . . . . .	623
Cams for zoom lenses, variable-pitch. Automatic highspeed inspection of . . . . .	1360
Cambridge University Engineering Laboratory: Research on cutting forces involved in gear shaping . . . . .	1404
Cambridge Vacuum Engineering Co., Ltd.: Electron beam welder . . . . .	882
Camrex Corrosion Consultants: Camoline Camsec security paint . . . . .	1129
Camshaft gears. Lees-Bradner type 7HDD . . . . .	472
Camshaft grinder. Toyo Kogyo numerically-controlled . . . . .	814
Camshafes. Russian induction hardening machine for . . . . .	454
Canada. British machine tool export prospects to . . . . .	647
Canning, W. & Co., Ltd.: 3M Airflow and Cooler buffs and mops . . . . .	602
Plant for barrel or rack plating . . . . .	805
Cant, A.: A pneumatic tape reading unit . . . . .	804
Capacitor-discharge stud welding equipment. Cycatron Mark 2 . . . . .	872
Capp, A., & Son, Ltd.: Extensions to premises . . . . .	1331
Carb-O-Grip chuck jaw inserts. Rok-It spherical bore gauge and . . . . .	248
Carbide-deposition equipment. Wocafix . . . . .	1046
Carbide. Ferro-Tic M-6 machinable age-hardening . . . . .	594
Carbide-hardfacing equipment for cutting tools. Dumore . . . . .	1103
Carbide inserts, rotating. Milling titanium at high speed with . . . . .	1351
Carbo-nitriding plant. Automatic . . . . .	343
Carborundum Co., Ltd.: Arborless wheels for grinding at very high speeds . . . . .	65
Cardew, Alexander, Ltd. . . . .	1210,1433
Carne, Rudolph, & Co., Ltd.: Demonstration of Huron type MU 6 . . . . .	264
CNP n.c. milling machine . . . . .	1061
See also . . . . .	646
Caro-Buhler bearing metal . . . . .	646
Carobronze, Ltd.: Carbochrome, Ltd.: New chromizing and chromium-aluminizing processes . . . . .	970
Carver & Co. (Engineers), Ltd.: Air-operated tube bending machines . . . . .	1376
Casting capacity, Expansion of malleable iron, at Folsain-Wycliffe Foundry . . . . .	1040
Casting, shell-mould, with zircon and sand. Advantages of . . . . .	1302
Castings, exclusion of dross from non-ferrous . . . . .	311
Castings, Sand, and gravity die castings re-designed for pressure casting . . . . .	422
Castrol Industrial, Ltd.: Open gear lubricants in aerosol dispensers . . . . .	580
Catmru Machine Tool Corporation, Ltd. . . . .	18,688,1102
Cave-Cut Machine Tool Co., Ltd.: Large type 12-50 friction sawing machine . . . . .	438
Type 3A high-speed cutting-off machine . . . . .	992

# Cavities in plastics moulding dies.

Selective plating of . . . . .	529
Cee gauge for continuously measuring the thickness of a moving strip. Solex . . . . .	1163
Cell. BISRA 50-ton load . . . . .	1200
Cell, load, Automatic Timing & Controls series 6004 . . . . .	540
Centre-column unit head machine. Cross . . . . .	536
Centre. Large rotating . . . . .	1189,1281
Centreless taper grinding at the works of Redcar Engineering Co. . . . .	1082
Ceramic components. Electrophoretic forming of . . . . .	1424
Ceramic tools, Boring with, in compensating spindles . . . . .	1314
Ceruti-Rockford type OS planing machine . . . . .	492
Chain testing machine. Fogg & Young . . . . .	1253
Chain testing machine. Tangres 160-ton . . . . .	358
Chains. Rex leaf . . . . .	373
Challis, Henry, Ltd. . . . .	475
Chamberlain Industries, Ltd.: Staffa Mark 16 10-cylinder hydrostatically-balanced hydraulic motor . . . . .	855
Chambersburg Engineering Co.: Impactor automated forging machine . . . . .	253
Changes in design of large vertical turning and boring machines. Revolutionary . . . . .	1024
Channel-section parts. Meddings multi-head machine for drilling . . . . .	1203
Channel Tool Distributors, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	994
Checking, angle, to 1 min. of arc. Shop floor . . . . .	989
Checking the concentricity of rotary tools. Equipment for . . . . .	93
Checking V-type cylinder blocks. Micromatic machine for . . . . .	19
Cherry Electrical Products Corp.: Crossbar slide selector switch . . . . .	541
Chesterfield Tube Co., Ltd.: Installation of Bronx roll straightening machine . . . . .	828
Childs, James J.: Contour machining by means of point-to-point n.c. . . . .	637
Chinese-built West Lake drilling machine . . . . .	1047
Chromalloy American Corp.: Ferro-Tic M-6 machinable age-hardening carbide . . . . .	594
Installation of large isostatic press for the production of Ferro-Tic blanks . . . . .	986
Chromium-aluminizing processes. New chromizing and . . . . .	970
Chromizing and chromium-aluminizing processes. New . . . . .	970
Chrysler Cummins, Ltd.: Installation of Kearney & Trecker C.V.A. special milling machine with sequence-controlled work-handling equipment . . . . .	236
Installation of Renault turbine transfer machine for operations on diesel engine cross-heads . . . . .	364,557
Chuck jaw inserts. Rok-It Carb-O-Grip . . . . .	248
Chuck. A simple vacuum . . . . .	1000
Chucks. S-P circular gripping pieces for 3-jaw . . . . .	300
Chucking automatic. Auto-handling on a Conomatic 6-spindle . . . . .	362
Chucking automatic. Churchill CAS-10 . . . . .	1204
Chucking automatic. Churchill Mark 2 . . . . .	969
Chucking automatic. Herbert-BSA type SCM single-spindle . . . . .	1102
Chucking automatic. Russian-built . . . . .	312
Chucking automatic. Russian type 1265 . . . . .	418
Chucking automatics. Productivity and profits increased with n.c. . . . .	85
Chucking lathe. Mafumat DF 315 num., with numerical control . . . . .	979
Churchill, Charles, & Co., Ltd.: "Bridge into Europe" . . . . .	766
Close-pitch throw-away tip face milling cutter . . . . .	941
New face-milling cutters . . . . .	235
See also . . . . .	538
Churchill, Charles H., Ltd.: Manchester exhibition . . . . .	1204
See also . . . . .	186,241,1037
Churchill-Denhams, Ltd.: Lathe arranged for taper turning with combined feeds . . . . .	1043
SRIOW centre lathe with Mimik Dyna-trace copying system . . . . .	993
Churchill Gear Machines, Ltd.: N.E. Churchill Divn.: Assembly of CA9-10 and BA60 automatics . . . . .	1254
Mark 2 chucking automatic . . . . .	969

Churchill-Redman type EC230 facing and centring machine for operations on rocker shaft components . . . . .	753
Cincinnati-Chomienne: New Toolmaster milling machine . . . . .	538
Cincinnati Milling Machine Co., U.S.A.: Cintrol Divn.: Acramatic IV numerical control system . . . . .	1036
Cincinnati Milling Machines, Ltd.: Cintimatic n.c. machines and economies obtained with their use . . . . .	184
See also . . . . .	1037
Cincinnati Shaper Co., Ltd.: Contact-operated shears . . . . .	135
Cinedo type 207-14 universal milling machine . . . . .	1205
Cintimatic n.c. machines. Economies obtained with the use of . . . . .	184
Circuit board holder. TR . . . . .	490
Circuit units, Texas Instruments integrated, for Acramatic n.c. system . . . . .	1036
Circulation certificate. "Machinery and Production Engineering" . . . . .	330
Clamp. Andrews work . . . . .	142
Clamps and T-nuts for Adcock & Shipley machines. Bolts . . . . .	45
Clamps. Triclamp tube . . . . .	186
Clamped-tip face milling cutters. Stora 3-System . . . . .	1349
Clamped-tip toolholder. New Uddex . . . . .	1368
Clamped-tip tooling. Wickman Wimet Econo-lock . . . . .	1062
Clamped-tip tools. Herbert-BSA . . . . .	550
Clamping levers. Kipp adjustable . . . . .	1357
Clark air pallets . . . . .	1274
Clark Engineering Service: Exhibits at London International Welding Exhibition . . . . .	927
Clark's Press Equipment, Ltd.: Precision Lubricant-spraying equipment . . . . .	17
Classification of Russian steels . . . . .	687
Clauden, Ltd.: Conveyorized infra-red oven . . . . .	105,276
Clayton Dewandre Co., Ltd.: Developments in compressor production . . . . .	172,396
Clayton Engineering Co.: Type 821 rotary position indicator . . . . .	860
Clean-oil installation at BMC. Alfa-Laval . . . . .	89
Clean room for assembly of British-built Milwaukee-Matics . . . . .	1309
Cleaner. A versatile machine tool sump . . . . .	656
Cleaner. Wedgo portable steam . . . . .	1364
Cleaning electric assemblies. Dawe ultrasonic equipment for . . . . .	858
Cleaning, Jet-wheel, facilitates grinding of certain alloy materials . . . . .	354,557
Climax Molybdenum Co.: Molybdenum mesh for exclusion of dross from non-ferrous castings . . . . .	311
Clover centre lathes . . . . .	1049
Clutch housing. Die cast . . . . .	425
Clutch. Stieber Mini freewheel . . . . .	37
Coordinate table. Russian type KCY-53 . . . . .	79
Coating. Fernox DW 66 strippable plastics . . . . .	403
Coating plant. Leonard Stace install . . . . .	1386
Jagenburg . . . . .	944
Coating system. Quentile solvent-free . . . . .	652
Coating. Takgard PC/747 pebble . . . . .	1114
Coding table for numerical control of machine tools. B.S.I. Interim . . . . .	474
Cogsdill Tool Products, Inc.: Flat surface roll burnishing machine . . . . .	844
Cohen, George, Machinery, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	1377
See also . . . . .	1261
Cohen, George, 600 Group: An advisory service for industrial training . . . . .	299
Coil cradles and strip straighteners. Atkin combined . . . . .	95
Coining press for brake shoes. Bliss 1000-ton . . . . .	620
Cold drawn sections. Production of small precision parts from . . . . .	329
Cold forming hydraulic press. Weldall & Assembly 1000-ton . . . . .	71
Cold forming spines and gear teeth . . . . .	737
Cold pressing. Glass-fibre reinforced plastic components produced by . . . . .	572
Cold sawing machines. Russian . . . . .	89
Colebourne, R., C.Eng., A.M.I.Mech.E., A.M.I.Prod.E.: Some practical aspects of the measurement of involute gear teeth . . . . .	459,773,899
Collar, Feed-through, and microcircuit jig . . . . .	66
Collar preforms. Drawn solder . . . . .	950
Collars. brass, Broomatic machine for drilling and tapping . . . . .	803
College of Aeronautics: The design of a pure fluid shaft encoder . . . . .	5

	PAGE		PAGE		PAGE
Collis, J., & Sons, Ltd.:		Control, photo-electric, unit. Detecta	374	Coupling which accommodates shaft offset	
Hand-controlled stillage truck	553	Control, Pneumatic guard, for die casting machine	1366	Schmidt	372
Collis, W.G.:		Control, production, Computer programme for	128	Couplings, Miller-Betabite high-pressure tube	304
The place for optical gauging in modern manufacture	574	Control, programme, Elan equipment for	1304	Court Works, Ltd.:	
Colonial Broach & Machine Co.:		Control, programme, equipment, and bar feed unit for capstan lathes. Gearaide	433	Super-malleable iron	1359
Uni-Slide series SD pull-down broaching machines	17	Control, programme, Machines with (see Programme control machines with)		Courtbound Positioners:	
"Compact" toothholder. Herbert-BSA	550	Control, Programme and numerical, systems for Parkinson Miller-Matic milling machine	250	Exhibits at London International Welding Exhibition	868
Compacting presses for metal powder.	588	Control, programme, for small-capacity capstan lathes. Ether	189	Coventry Gauge & Tool Co., Ltd.:	
BETEMA:		Control, sequence, Kearney & Trecker-C.V.A. special milling machine with work-handling equipment with	236	Exhibits at International Engineering and Marine Exhibition	925
Comparator, Angle, incorporating diffraction gratings	989	Control system. Electro-hydraulic pulsed	829	Matrix jig borer with diffraction grating and inter-ferometric measuring system	38
Comparator. Sigma type 31EM inch-metric	150	Control, tape, Machines with (see Numerical control, machines with)		Cover, front, for IC engine. Transfer machine for operations on	581
Compound work table. Taylor	1223	Control, thermostat, system. Brookhirst Igranite	421	Cowlishaw Walker, Ltd.:	
Compressor production at the works of Clayton Dewandre	172,396	Control, thyristor, Variable-speed motors with	60	600-ton blanking press	1295
Compressors. "Consolidated Pneumatic"		Control unit of Accuratool capstan lathe. Plugboard on	694	Crack detector. Esab Maganotax type 167/1 semi-automatic	873
Power Vane mobile	1006	Control units, Electronic, for instruction in n.c.	831	Crankcase timing cover. Die cast	424
Computer-aided design	125	Control valves. New "Air Automation"	1372	Crankshaft grinder. Newall type AHAC automatic	1051
Computer, Application of a, to cost estimating	178	Control, velocity for machine tool applications. Open-loop	1155	Crankshafts. Deep-hole drilling equipment for	397
Computer control of machine tools. Direct	493	Controlling a critical die casting. Producing and	709	Crankshafts. Facing and centring, Meddings machine for	1098
Computer Controls, Ltd.	762	Controlling modern flying shears	743	Craven Bros. (Manchester), Ltd.:	
Computer-designed David Brown gear units	432	Controlx modular plugboards	763	72½-in. lathe installed at English Steel Forge & Engng. Corp.	775
Computer industry. Metrology in the	284	Conversion system. GKN automatic capstan	1165	Plans for expanding the Fabrication Division	741
Computer programme. KIPPS	606	Conversions between inches and millimetres. Feams calculator for	1418	Transportable billet drilling machine	98
Computer. SABLE invoicing. Savings obtained with a	1206,1332	Converter. binary to decimal, Marconi pneumatic tape reader and associated	1199	Transportable milling machine for operations on turbine rotors and castings	719
Computer service for industry. A new	609	Conveyancer Fork Trucks, Ltd.:		Cressex Machinery, Ltd.:	
Computer simulation to facilitate manufacturing planning	631	Walkie pedestrian-controlled fork-lift truck	1273	Hand tapping machine	1266
Computer system of production control. The Harwell	128	Conveyor. Bendveoyr power-driven belt	1072	Ludor type IV vertical milling machine	851
Computer. Univac fluid logic	800	"Conveyor" for wax patterns, Water trough	1018	Power press equipped with Guy-Raymond dial feed unit	1375
Computers, Use of, for production of tapes for numerically-controlled machine tools	606	Conveyor. Orton belt-type	441	Type 150/800 centre lathe	1044
Concentricity of rotary tools. Equipment for checking the	93	Conveyor. Pantin pre-pressure	92	Crimping machine for joining detonators to lengths of safety fuse	124
Concord, Elliott, lathe of "cubed" construction	1055	Conveyor. Westria Alltrans portable	1273	Criscross permanent magnet pulleys	324
Cone Automatic Machine Co., Ltd.:		Coolant pump for Vertomat transfer machine.	1435	Cromack, Benjamin, Ltd.:	
Conomatic 6-spindle chucking automatic	362	Coolant refrigerating units. F. & R.	1039	Air heater	327
Connecting rods. Russian transfer machine for	453	Cooper Precision Engineering, Ltd.:		Crompton Parkinson, Ltd.:	
Conomatic 6-spindle chucking automatic. Auto-handling on a	362	New factory at Walsall	891	Crompton-Dupar small brake motors	1159
Consolidated Pneumatic Tool Co., Ltd.:		Copper-coated steel strip	295	Cycatron Mark 2 capacitor-discharge stud welding equipment	871
Power Vane mobile compressors	1006	Copy-machining operations on a complex thin-walled component	132	Drive for a sheet slitting line	143
Contact-operated shears. Cincinnati	135	Copy-milling machine. Ingers-Profilos hydraulic	666	Croning shell moulding machines. British-built	590
Contacts. Some aspects of the manufacture of precious-metal	1344	Copy-milling machine. Rambaudi Ramcop-3D	1320	Cropping forgings from bar. Machine for	476
Contelyst electrolytic surface grinders.		Copy-milling machines. Sverdlow	119	Cross Company:	
Abwood	832	Copy turning. Weisser Hektor lathe equipped for automatic	1263	Centre-column unit-head machine	536
Contour cutter grinder. A typical set-up on a Smart & Brown-Aldridge	325	Copying equipment. Gettys 3-dimensional electronic	1374	Transfer machine for operations on fragile die castings	581
Contour machining by means of point-to-point n.c.	637	Copying equipment. Versa-Trace, on a Swift type 25DK roll-turning lathe	1142	Cesep Metal Works:	
Contour turning under tracer control. Advantages of	817,898	Copying lathe. Mondiale Gallicop automatic	942	Installation of British foundry equipment "Cubed" construction. Elliott machine tools of	290
Control, Auto-Robot, for Herbert No. 0 capstan	750	Copying lathe. Pontoglio type TO 450 hydraulic	1265	Curley abrasive-wheel cutting-off machine	1054
Control, Direct computer, of machine tools	493	Copying system. Mimik Dynatrace hydraulic, Churchill-Denham centre lathe equipped with	993	Curtis, E.J.:	
Control, drilling sequence, system. Fluidic circuits used in a	801	Cores. Extruded shell	789	Sources of standards information for machine tools and allied equipment	67
Control, fluid logic, equipment on Czech eccentric press. Aro	1377	Cores, Sand, used for low pressure die casting	208	Cut-Kost throw-away tip toothholder.	
Control, fluid logic, equipment. New Maxam turbulence amplifier for	40	Corr. K.F.:		Herbert-BSA	550
Control, numerical, Machines with (see Numerical control, machines with)		Die casting die sprue and runner design	1425	Cut-to-length lines. Humphris precision	495
Control, numerical, Contour machining by means of point-to-point	637	Correcting and grading machine. Schenck fully-automatic balancing, for small rotors	1157	Cutmaster-Stone type M160 cutting-off machine	914
Control, numerical, developments. Japanese	810	Correcting straightness error: Reamer for	1082	Cutter grinder. Russian-built gear shaper	317
Control, numerical, Economies obtained with Cintimatic machines with	184	Correction factors for Vickers hardness tests on curved surfaces	587,773	Cutter, Prolite 50-mm. Futurmil	183
Control, numerical, equipment, Applying, to existing machines	524,1091	Corrosion prevention material. Sudbury wet-metal protector	38	"Cutter". Water	549
Control, numerical, equipment. Construction of Olivetti	1136	Corrosion resistance of Dur-Ni treated bumpers. Improved	1301	Cutting flexible cable accurately to preset lengths	377
Control, Numerical, for oxy-cutting machines	131	Cosmecca AG:		Cutting fluid. Lev Tap	1325
Control, numerical, of machine tools. The application of fluidics in the	802	Wocafix carbide-deposition equipment	1046	Cutting-off machine. Cave-Cut type 34 high-speed	992
Control, Numerical, by operator	731	Cost estimating. Application of a computer to Coulthard, Wm., & Co., Ltd.:	178	Cutting-off machine. Cutmaster-Stone type M160	474
Control, numerical, and measuring system. Philips	1327	Central and side gating systems for pressure die casting	1388	Cutting-off machine. MMT abrasive-wheel	1262
Control, numerical, Productivity and profits increased with chucking automatics with	85	Council of Industrial Design Awards for 1967	1166	Cutting oil. Aquicut Super 10	247
Control, numerical, A sub-contract service for machining with	820	Counting and batching equipment. Decca	1146	Cycatron Mark 2 capacitor-discharge stud welding equipment	872
Control, numerical, system. Acramatic IV	1036	Mastercount type 452	1164	Cylinder blocks. Micromatic machine for checking V type	19
Control, numerical, system. Mark Century IUDM	890	Counting unit. Elcometer high-peak	539	Cylinder blocks, Recovery of damaged, by selective plating	479
Control, numerical, system. Mark 100B	139	Counting unit. Radiatron	239	Cylinder bores in motor car engine blocks. Machining, with ceramic tools in compensating spindle	1314
Control, numerical, system. Numeroblock	28	Coupling. Hawker Siddeley fluid	1370	Cylinder. Bradbury Speedram compound	31
Control, numerical, System for production by	1396	Coupling ring of Allen-Stoeckicht epicyclic gear. Schiess gear shaper set up for cutting teeth in the	946	Cylinders. Baldwin position-controlled air	72
Control, numerical, "Universal" fixtures and auxiliary equipment for machines with	1420			Cylinders. Schrader aluminium air	263
Control, Numerical, without feed-back	47			Cylinders, Tomkins-Johnson air and hydraulic, with built-in limit switches	36
				Czechoslovak-built type A 50 A automatic. Set-up on a, for producing a component from Duralumin bar	1322

Czechoslovak-built LKM 630 crank-type forging press with equipment for varying day-light on the machine . . . . .	1379,1446
Czechoslovak machine tool developments . . . . .	242,639
Czechoslovak type LE 160 eccentric press with Aro fluid logic control . . . . .	1377

## D

D.E.B. Electronics, Ltd.: Pugboard programming unit . . . . .	765
DIA Maschinen-Export: Exhibits at London International Engineering and Marine Exhibition . . . . .	919
D.I.M.O., Ltd.: Low pressure die casting machines . . . . .	714
Low pressure die casting machines installed at Slough Metals . . . . .	203
DME Corporation: Standard and unit die system . . . . .	428
Dabringhaus, G.: Copy-machining operations on a complex thin-walled component . . . . .	132
Damaged cylinder blocks, Recovery of, by selective plating . . . . .	479
D'Andrea boring and facing heads . . . . .	96
Danfoss (London), Ltd.: Orbit hydraulic motor on plastics extrusion machine . . . . .	494
Danly Machine Specialties, Ltd.: New press line at Ford Halewood works . . . . .	960
Davall Group, Ltd.: Powergrip pulley drives . . . . .	188
Davis, John, & Son (Derby) Ltd.: Installation of Randalrak work/assembly benches . . . . .	1332
Davis Pneumatic Systems, Ltd.: Drill feed-and automatic work shuttle equipment . . . . .	1164
Impulse relay valve . . . . .	303
Red Ring air-operated toggle press . . . . .	1163
Davis, Stuart, Machines, Ltd.: Special duplex boring machine . . . . .	39
Davy & United Roll Foundry, Ltd.: Installation of large Forcip mill-roll lathe . . . . .	241
Dawe Instruments, Ltd.: Type 1851 ultrasonic hardness testing machine . . . . .	95
Type 118A ultrasonic machining equipment . . . . .	749
Ultrasonic equipment for cleaning electric as. mbles . . . . .	858
Vibration monitoring equipment . . . . .	465
See also . . . . .	1106
Dazor type M 209 floating magnifier . . . . .	1316
De-jamming arrangement for power presses . . . . .	880
Spherelease . . . . .	758
De-seaming lines, Highly mechanized inspection and, in a steelworks . . . . .	473
De Tomasi, Alfredo: Try-Deta programme controlled milling machines . . . . .	1001
Dean, Smith & Grace, Ltd.: New tape-controlled lathes . . . . .	1109
Numerically-controlled lathes - their design background and programming . . . . .	945
Deburring and finishing machine. Roto-Finish Oronaut . . . . .	1139
Deburring bar material and tubing. Burr-master machine for . . . . .	994
Deburring condenser plates by brushing . . . . .	134
Deburring machine. Tiki gear . . . . .	596
Deburring set screws. Method of sizing and . . . . .	1161
Decma Mastercount type 152 counting and batching equipment . . . . .	1164
Deep-hole drilling equipment for crankshafts . . . . .	397
Degassed steels. Experiences with vacuum . . . . .	690
Degreasing unit. Karl Roll vapour . . . . .	1264
Delapena & Son, Ltd.: Induction heating equipment for seam welding tubing . . . . .	864
Twin horizontal automatic shaft hardening machine . . . . .	535
Delapena, Paul, Ltd.: Versatile machine tool sump cleaner . . . . .	656
Delft Laboratory. Avery calibration machine for . . . . .	240
Delivery system for workpieces. Kingfisher pipeline . . . . .	699
Deloro Stellite, Ltd.: Exhibits at International Welding Exhibition . . . . .	927
Delta Machine Services, Ltd.: "At home" exhibition . . . . .	1435
Turbine screwdriver unit and bowl feeder . . . . .	1108
Vertomat rotary-indexing transfer machine . . . . .	1162

Dendix Brushes, Ltd.: Burrmaster machine for deburring bar material and tubing . . . . .	994
Denison, Saml., & Son, Ltd.: 20-ton electronic high-temperature tensile testing machine . . . . .	911
Deposition, carbide, equipment. Wocafix . . . . .	1046
DeRobertis, Joseph: Applications of industrial robots . . . . .	179
Design Awards for 1967. Council of Industrial . . . . .	1166
Design by teamwork . . . . .	1287
Design. Computer-aided . . . . .	125
Design of large vertical turning and boring machines. Revolutionary changes in the . . . . .	1024
Design. Organizing for . . . . .	227
Design of Russian machine tools. Industrial . . . . .	907
Desoutter Lang Pneumatic, Ltd.: Solenoid spool valve . . . . .	303
Detecta photo-electric control unit . . . . .	374
Detonators, Crimping machine for joining, to lengths of safety fuse . . . . .	124
Detromat programme-controlled drum turret lathes . . . . .	1086
Devcon, Ltd.: Dev Tap cutting fluid . . . . .	1325
Flexane urethane material for lining tumbler barrels . . . . .	64
"Plastic Carbide" abrasion resistant material . . . . .	1244
Stop Slip belt dressing . . . . .	1364
"Twist Off" for rusted nuts and bolts . . . . .	1323
Dewhurst & Partner, Ltd.: Crompton-Dupar small brake motors . . . . .	1159
Dewrance Controls, Ltd.: Asco miniature solenoid valve . . . . .	34
Type 8345 B1 valve . . . . .	721
Dewrance Metals, Ltd.: Mark 3 brazing torch . . . . .	918
Dex Machine Tools, Ltd.: Multi-spindle heads with involute splines . . . . .	769
Dexion, Ltd.: Exhibits at Scottish Materials Handling Exhibition . . . . .	1272
Speedlock adjustable construction components for storage racks . . . . .	634
Steel shelves . . . . .	655
Diagrammer. The Mergenthaler . . . . .	1152
Dial indicators. Baty inch and metric reading . . . . .	1185
Dial units. Vickers metric/inch . . . . .	32
Diamond abrasive belts. Behr-Manning . . . . .	40,1188
Diamond consumption. Industrial . . . . .	740
Diamond tool grinding machine. Russian type . . . . .	196
3623 electrolytic . . . . .	692
Diamond tools for machining hard rubber components. Use of . . . . .	722
Die cast aluminium squirrel-cage rotors for electric motors . . . . .	709
Die casting. Acurad, data for . . . . .	708
Die casting. Developments in low pressure . . . . .	202
Die casting die-spotting press. Frech type . . . . .	1433
TP 630-20 . . . . .	1425
Die casting die sprue and runner design . . . . .	1220
Die casting machine. Fodel hydraulic gravity . . . . .	1366
Die casting machine. Pneumatic guard control for . . . . .	203,714
Die casting machines. DIMO low pressure . . . . .	1210
Die casting machines, Frech - their design and applications . . . . .	1431
Die casting machines. New Buhler 160-D, with direct injection system . . . . .	936
Die casting. Pressure, at the works of Singer Manfg. Co. . . . .	930,1388
Die casting. pressure, Central and side gating systems for . . . . .	709
Die casting. Producing and controlling a critical . . . . .	703
Die casting production. Ejector mechanism for fully-automatic . . . . .	430
Diecasting Society. Activities of the . . . . .	1219
Diecasting Society. General meeting of the . . . . .	422
Die castings. Gravity, and sand castings re-designed for pressure casting . . . . .	581
Die castings. Transfer machine for operations on fragile . . . . .	379
Die cavities. Impact forming . . . . .	1408
Die Sets, Ltd.: 4-pillar die set . . . . .	195
Die-sinking machine. Russian type 4b 772 . . . . .	197
combined ultrasonic and electrolytic . . . . .	806
Die-sinking machine. Russian type 4723 . . . . .	1433
spark-erosion . . . . .	94
Die-splitting bandsawing machine. Havart . . . . .	428
billot cutting-off and . . . . .	813
Die-spotting press. Frech type TP 630-20 . . . . .	1281
Die-spotting press. Larry Berry . . . . .	
Die system. The DME standard and unit . . . . .	

Dies. "Rapid Die" method of making steel rule . . . . .	521
Dies, Rubber, for wax patterns for small-quantity investment casting . . . . .	635
Dieing press. VEB Pressenwerk Bad Salungen type PASU 63 . . . . .	1090
Diemold, Inc.: Selective plating of cavities in plastics moulding dies . . . . .	529
Diesel engine cross-heads. Renault Miniline transfer machine for operations on . . . . .	364,557
Diesel engine production at Minsk Motor Works . . . . .	340,452
Diffraction grating and interferometric measuring system. Matrix jig borer with . . . . .	38
Diffraction gratings. Angle comparator incorporating . . . . .	989
Diffraction measurement of small dimensions. Laser equipment for . . . . .	1186
Digitum - a system for improving production efficiency of centre lathes . . . . .	1180
Dimensional gauging equipment . . . . .	1205
Dip painting equipment. "Automatic Equipment" . . . . .	144
Disc pad. Norton Flexi-Disc and fibre . . . . .	805
Display panel. Magnetic visual . . . . .	45
Display switching. Honeywell KB modular keyboard system of . . . . .	541
Distance measurement. Application of lasers to . . . . .	1369
Distributor unit. "Applied Electronics" mains . . . . .	127
Distributors caps. Meddings machine for boring . . . . .	149
Dividing machine. Enims type MC-18M linear . . . . .	81
Dividing tables. Driss indexing and . . . . .	605
Dollery & Palmer, Ltd. . . . .	1308
Donovan Electrical Co., Ltd.: Eddytest proximity switches . . . . .	302
Door assembly line. The new Ford . . . . .	508
Dore Engineering: Bending tools . . . . .	320
Dorman Machinery Sales, Ltd. . . . .	479
Double A Products Co.: Applications of gun reaming in valve production . . . . .	689
Dowding & Doll, Ltd.: Accuratool 1-in. automatic capstan . . . . .	693,1383
Machine tool demonstration . . . . .	1383
Drafting machine. Ozalid Kuhlmann Standard L . . . . .	30
Drainage system, British Rail experimental, made from reinforced plastics pressings . . . . .	740
Drawbea machine for wire netting production . . . . .	797
Drawbea wire spooling machine . . . . .	1046
Drawing measuring machine. Applications of the Ferranti . . . . .	585,1399
Drawings. The Mergenthaler Diagrammer for production of . . . . .	1152
Drei-S-Werk square and rectangular piercing punches . . . . .	1438
Drill feed and automatic work shuttle equipment. Davis . . . . .	1164
Drill grinders. Brierley Mark III . . . . .	1098
Drill Service (Horley), Ltd.: Reamer for correcting straightness errors . . . . .	1082
Drills. Breakage of small. Eliminating . . . . .	136
Drills. Bux electromagnetic base portable . . . . .	201
Drills, pointing small, automatically. Machine for . . . . .	1365
Drilling attachment. Tebo indexing fixture and . . . . .	475
Drilling channel-section parts. Meddings multi-head machine for . . . . .	1203
Drilling equipment, Deep-hole, for crank-shafts . . . . .	397
Drilling and facing machine. New Richards . . . . .	321
Drilling heads, Multi-spindle, used on Warner Swayse Asquith automatic . . . . .	1104
Drilling heads. Table unit for Grinston . . . . .	1044
Drilling holes in tubes. Meddings machine for . . . . .	1416
Drilling installation. Automatic girder . . . . .	265
Drilling jig for gear component. Purefoy . . . . .	1406
Drilling machine, Automatic tube, with simple programming system . . . . .	412
Drilling machine, bench, Chinese-built West Lake . . . . .	1047
Drilling machine. Craven transportable bullet . . . . .	98
Drilling machine. Foradial radial . . . . .	822
Drilling machine. Fyna bench . . . . .	1268
Drilling machine with Grinston-AEI numerically-controlled co-ordinate table . . . . .	42
Hungarian heavy-duty radial . . . . .	1350
Drilling machines. Instabrace safety equipment for . . . . .	473
Drilling machine. Solberga type SE7S . . . . .	147
Drilling machine. Startrite multi-head . . . . .	119
Drilling machine. Sverdlow condenser-plate . . . . .	813
Drilling machine. Toyo Kogyo T-4518 8-station n.c. turret . . . . .	1281
Drilling machine. Trojan automatic special-purpose . . . . .	

	PAGE		PAGE		PAGE
Drilling machine. Vero Autodrive n.c., Quick-change work platens for the .....	145	Electrical contacts. Some aspects of the manufacture of precious-metal .....	1344	English Electric-Leo-Marconi Computers, Ltd.: Metrology in the computer industry .....	284
Drilling machine with multiple type 1B spindle heads. Grinston .....	96	Electrical Control Equipment Exhibition at United States Trade Center .....	540	N.C. programming seminar .....	606
Drilling machine with two spindle heads. Vero turret-type n.c. ....	22	Electro-chemical machines. Large-capacity Electro-chemical machining for high-volume production .....	1417	English, J.W.R.: Controlling modern flying shears .....	743
Drilling, milling and boring machine. Fiat Modena-Matic 220 n.c. ....	1045	Electro-chemical marking machine. The Pryor E.P. 70 .....	326	English Steel Corporation, Ltd.: Progress in the production of large forgings .....	1207
Drilling sequence control system. Fluidic circuits used in a .....	801	Electro-deposited composite materials .....	626	English Steel Forge & Engng. Corp., Ltd.: Installation of 72½-in. Craven lathe .....	775
Drilling and tapping brass collars. Broomatic machine for .....	950	Electro-forming. Some current developments in .....	476,889	Engraving machine, Pantograph, modified for electric etching .....	9
Drilling and tapping hub components. Steinel rotary transfer machine for .....	688	Electro-hydraulic pulsed control system .....	732	Enims KCY-53 co-ordinate table .....	79
Drilling and tapping radiator elements. Special Russian machine for .....	568	Electro-magnetic forming machine. Russian MEY .....	829	Enims type 5310 A high-accuracy gear hobber .....	316
Drilling and tapping units. Brookman Selfocdrill air-operated .....	862	Electro-optical measuring system. Russian .....	417	Enims type 5300 instrument gear cutter .....	319
Drilling units. Westwind Turbines self-feeding Driss Engineering Products, Ltd.: .....	91	Electro-slag refining equipment. AEI-Birlec .....	230	Enims MC-18M linear dividing machine .....	81
Indexing and dividing tables .....	605	Electro-slag welding of forgings .....	482	Enims spark erosion machines .....	192
Storm arbor press with percussion ram .....	818	Electrolytic diamond tool grinding machine. Russian type 3623 .....	1208	Enots, Ltd.: Multi-point lubrication system for Hupfield injection moulding machines .....	662
Drive for a short slitting line. Crompton Parkinson .....	143	Electrolytic die-sinking machine. Russian type 4B 772 combined ultrasonic and .....	196	Rotary indexing table .....	151
Drive systems, hydrostatic. Developments in, at the National Engineering Laboratory .....	291	Electrolytic surface grinders. Abwood-Contelyt .....	195	Sintered bronze silencers for pneumatic systems .....	484
Drives. Davall Powergrip pulley .....	188	Electron beam welder. CVE .....	832	Enox No. 50 tool trolley .....	686
Dross, Exclusion of, from non-ferrous castings .....	311	Electron beam welding. Developments in .....	882	Enplate Ni-410 chemical nickel plating process .....	1325
Duckham, Alexander, & Co., Ltd.: Adept dry film lubricant .....	1151	Electron beam welding machine with medium-vacuum work chamber. Sciaky type CV2 .....	140	Enthoven Solders, Ltd.: Drawn solder collar preforms .....	66
Adformax E.P. taping compound .....	260	Electronic control units for instruction in R.C. .....	1099	Enzesfeld-Caro Metallwerke AG: Caro-Buhler bearing metal .....	646
Aquicut Super 10 cutting oil .....	247	Electronic grinding wheel balancing equipment. Balatron .....	831	Erfurt Machinery, Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	845,913
Dumore Co.: Carbide hardfacing equipment for cutting tools .....	1103	Electronic Machine Control (Sales), Ltd.: Proximitor guard equipment .....	1266	Organization of visit to East Germany by British industrialists .....	494
Exhibits at London International Engineering and Marine Exhibition .....	996	Electronic & Mechanical Engineering Co., Ltd.: Portable arc welding machine .....	23	See also .....	1087
Duplicator. Alexander I.: 1 hand .....	694	Electronic thermometer. Telemechanics .....	252	Erfurt, VEB Pressen- und Scherenbau: Stator and rotor lamination plant .....	1089
Dur-Ni treated bumpers. Improved corrosion resistance of .....	996	Electronic 3-dimensional coupling equipment. Gettys .....	33	Type UWQ 40 by 400 transverse roll-forming machine .....	1087
Dust collector unit. Spensstead bench-type .....	1301	Electronics. Peto Scott equipment for progressive theoretical and practical instruction in .....	1374	Eriez Magnetics: Crisscross permanent magnet pulleys .....	324
Dyke, R.M.: Read-out systems facilitate production .....	477	Electrophoretic forming of ceramic components .....	104	Erosion machine. Newall-AGIE type 1520-75K jig .....	663,834
Dynamic balancing machine. Large C.E.M.B. Dynamic torque tracer for testing Rotenoid rotary solenoids .....	530	Electrostatic paint spraying equipment. Volstatic Speedspray .....	1424	Esab, Ltd.: Magnatox type 167/1 semi-automatic crack detector .....	873
Dynapak machine. Examples of high energy rate forging on a .....	267	Elevator and hopper unit. Valley .....	21	Escobar, A.R., Jr.: Application of gun reaming in valve production .....	689
Dynatrac hydraulic coupling system. Churchill-Denham centre lathe equipped with Mimik .....	1147	Elga Hydramess hydraulic press brakes .....	353	Eskelin, Arthur F.: Milling titanium at high speed with rotating carbide inserts .....	1351
Dynex Co., Ltd.: Machine tool demonstration .....	993	Elgomatic Milmor milling machine with Airmec Autoset tape control .....	262	Essa press. Fine blanking on an .....	1095
Hydraulic pumps .....	35	Elgar Machine Tool Co., Ltd.: Elgapress 40-ton inclinable power press .....	850	Esso Petroleum Co., Ltd.: Film: Esso industrial lubrication services .....	1010,1120
		See also .....	472	Results obtained with iodine in lubricants .....	584
		Elliott, B. (Machinery), Ltd.: Concord lathes .....	1320	Etching, electric, Pantograph engraving machine modified for .....	9
		Concord lathes .....	472	Ether, Ltd.: Programme control for small capacity capstan lathes .....	189
		Elgomatic Milmor tape-controlled milling machine .....	1056	Ex-Cell-O Corporation: Machine Tool Divn.: Boring with ceramic tools in compensating spindles .....	1314
		Elliott-Omniscient centre lathe set up for turning cast iron .....	1058	Micromatic Hone Divn.: Automatic inspection equipment for pistons .....	404
		Hydraulic surface grinder .....	266	Exhaust gas control system. Production of pump components for an .....	542
		Milling machines, lathes and grinders of "cubed" construction .....	1056	Exhibitions: American Electrical Control Equipment .....	540
		Sturdimill milling machines .....	952,1054	"Approaching Automation" .....	1162
		Tape-controlled milling machines .....	1057	Future Logic Conference and Exhibition. 2nd International .....	211,485,801
		Elliott Machine Equipment, Ltd.: E.M.E./Nikken milling tool set .....	922	International Welding .....	864,926,997
		E.M.E./Nikken milling tool set .....	922	Kingston Quality and Reliability .....	497
		Ellis Bros. (Leicester), Ltd.: Type 1/60 belt grinding machine .....	1102	Leipzig Spring Fair .....	547,975,1083
		Elm Works, Ltd.: Gold Star unit press tools .....	996	London International Engineering and Marine .....	844,910,992,1374
		Elton, R.: Improved support pad arrangement for boring tools .....	523	Physics .....	1195
		Embassy Machine & Tool Co., Ltd. .....	12,952,1048,1264	Russian Machine Tool .....	77,192,312,413
		Emms, Theodore, Ltd.: Installation of sheet slitting line incorporating Crompton Parkinson drive .....	143	Scottish Materials Handling .....	1272
		Encoder. The design of a pure fluid shaft .....	803	Explosive forming. Developments in .....	13
		Encoders. Marconi optical shaft and pneumatic shaft .....	1197,1198	Explosive forming of large plates .....	378
		Engine components. Production of Russian motor car .....	788	Explosive forming. Shape-correction by .....	379
		Engineering Export Production Council (India): Exhibits at London International Engineering and Marine Exhibition .....	912	Explosive forming, Water-backed, without a tank .....	378
		Engineering Industries Association: 7th annual exhibition by Yorkshire region .....	822	Export. Complete plants for .....	395
		English Electric Co., Ltd.: Fluidics development programme .....	1063	Export prospects to Canada. British machine tool .....	647
		Instabrace safety equipment for drilling machines .....	1350	Exports and imports of machinery .....	959
		English Electric-Arc Welding Co., Ltd.: Exhibits at International Welding Exhibition .....	999	Exports. British machine tool .....	55,164,443,839,1068,1399,1445
				Classified: 108,220,388,780,896,1171,1389 and facing pages 1120,1284,1392	



	PAGE
Exports. U.S. machine tool	163,385,354,1118,1280
Extruded shell cores	789
Extrusion, Hydrostatic, developments	751
<b>F</b>	
F. & R. Engineering Co., Ltd.:	
Coolant refrigerating units	1039
FCB ultra high-speed press feed unit	535
FSI industrial training group	103
Fabrication Division of Craven Bros.	
Plans for expanding the	741
Face milling cutters. New Churchill	235
Facing and boring machine. Wyvertic turning	261
Facing and centring crankshafts. Meddings machine for	1098
Facing and centring machine. Baier	699
Facing and centring machine. Churchill	
Redman type EC230, with automatic work handling arrangement	753
Facing heads. D'Andrea boring and	96
Factory planning model system. Modulex	651
Fasteners and Turned Parts Institute	46
Fasteners. True Position tolerances for	1244
Fault indicator for transfer machines. Russian	906
Farms Calculators:	
Calculator for conversions between inches and millimetres	1418
Federation of Sussex Industries industrial training group	103
Feed, drill, and automatic work shuttle equipment. Davis	1164
Feed mechanism for spring coiling machines. Torrington auxiliary.	141
Feed rollers. Improvement in working life of	376
Feed, screw, and assembly unit. R.E.M.	1108
Feed-through collar and microcircuit jig	9
Feed unit, bar, for capstan lathes. Gearside programme control equipment and	433
Feed unit. press, FCB ultra high-speed	535
Feed units. Guy-Raymond dial, on Cressex inclinable power press	1375
Feeder, bowl, R.E.M. turbine screwdriver unit and	1108
Feeder for pin-type components. Aylesbury Automation multiple	649
Feeding shafts to a centreless grinder. Automatic equipment for	1023
Femaru type RT 80 turret lathe.	43
Fenner, J.H., & Co., Ltd.:	
Exhibits at London International Engineering and Marine Exhibition	856
Ferox DW 66 strippable plastics coating	403
Ferranti, Ltd.:	
Application of the company's drawing measuring machine.	585,1400
Digiturn - a system for improving the production efficiency of centre lathes	1180
System for production by numerical control	1396
3-dimensional inspection machine	380
Ferro-Tic blanks. Large isostatic press for the production of	986
Ferro-Tic M-6 machinable age-hardening carbide	594
Fiat S.p.A.:	
Modena-Matic 220 n.c. drilling, milling and boring machine	1045
Fibre disc pad. Norton Flexi-Disc and	805
Fibre optics applied to position measurement	1198
Fibrotakt indexing table	863
Fielding & Platt, Ltd.:	
Dynapak machine installed at Armstrong	1147
Stevens & Son	751
Hydrostatic extrusion presses	420
File cutting machine. Russian E3-32 round	
Films:	
A plus for plastics (British Industrial Plastics)	1115
A world of wire (British Ropes)	1284
Billet grinding and forging (Brookes Oldbury)	614
Industrial lubrication system (Esso)	1010,1120
Introducing the diesel engine (Perkins)	49
Lathe production (Weiler KG)	1232
Lathe tools (Jones & Shipman)	819
Lower your handicap (Jones & Lamson)	552
Lubrication of rolling bearings (Shell-Mex & B.P.)	1232
Mother machine (Hindustan Machine Tools)	819
NC management style (Jones & Lamson)	440
New films (British Productivity Council)	

	PAGE
Filtering unit. Shipston type FP2 compressed air	858
Fine blanking on an Essa press	1095
Fine Blanking, Ltd.:	
Extended range of Fine-O-Matic fine blanking presses	522
Fine-boring machine. TOS-Kurim type WIS 63 multi-spindle	640
Fine-O-Matic fine blanking presses. Extended range of	522
Finishing machine, deburring and, Roto-Finish Oronaut	945
Finishing mills. New 4-crank shear for semi-Finishing technique. "Satia"	1308
Finishing the faces of 7-cylinder barrels for the Taurodyne hydrostatic tractor transmission. 36-in. Lapmaster machine set up for	602
Finishing. Vibratory deburring and	772
Finned tubes for oil refinery. Howco-G-Fin	1139
First State Watch Factory, Moscow:	598
Production of cases for Poljot wrist watches	1236
Firth-Cleveland-Bliss ultra high-speed press feed unit	535
Fixtures and auxiliary equipment for n.c. machines. "Universal"	1420
Flame-cutting machine. Large Messer Griesheim Sicomat	1053
Flame-cutting machine. Statocac SK automatic multiple	1382
Flash removal from plastics parts. Automatic	76
Flask, vacuum, installation. Bader	1306
Flexane. Use of, for lining tumbler barrels	64
Flexi-Disc and fibre disc pad. Norton	805
Flexible seamless metallic hoses. Omnibutes	748
Flexibox, Ltd.:	
Type 40A lapping machine for flat surfaces	532
Floor lacquer. Oxan oil Norwegian	1005
Fluid coupling. Hawker Siddeley	1370
Fluid Form attachment on a Fogg & Young press. SAAB	1317
Fluid logic computer. Univac	800
Fluid Logic Conference and Exhibition. Second International	211,485,801
Papers read:	
Application of fluidics in the numerical control of machine tools	802
Design and manufacture of pure fluid elements	485
Design of a pure fluid shaft encoder	803
Fluidic absolute measuring system	490
Fluidic circuits used in a drilling sequence control circuit	801
Industrial scale manufacture of pure fluid units from acrylic material by a special casting process	486
On the design, characteristics and production of turbulence amplifiers	487
Pneumatic tape reading unit	804
Some industrial applications of the Moduflog systems	488
Fluid logic control equipment. New Maxam turbulence amplifier for	40
Fluid logic control equipment on Czech eccentric press. Aro	1377
Fluid logic diode. Input/output performance curves for forward and reverse flow of the "Aviation Electric"	211
Fluid logic experimental kit	1059
Fluid logic. Is full advantage being taken of	171
Fluid logic system for safety control. Maxalog	124
Fluid logic units. Plessey	212
Fluidic developments	1199
Fluidics development programme. English Electric	1063
Fluidics unit as part of supervisory equipment for large steam turbine installation	1063
Fodel hydraulic gravity die casting machine	1220
Fogg & Young Engineering, Ltd.:	
Chain testing machine	1253
1500-ton hydraulic press with SAAB Fluid Form attachment	1317
Follins-Wycliffe Foundries, Ltd.:	
Expansion of malleable iron casting capacity	1040
Foradia radial drilling machine	822
Ford Motor Co., Ltd.:	
Installation of large Berry die-spotting press	94
New Daily press line at Halewood works	960
New door assembly line	508
Ford Motor Co., U.S.A.:	
Automated hot forging installation	253
Production of pump components for the Thermactor exhaust gas control system	542
Transfer machine performance improved with hydrostatic bearings	984

	PAGE
Forging, high energy rate, on a Dynapak machine. Examples of	1147
Forging installation. Automated hot	253
Forging machine. roll, Erfurt UWQ 40 by 400 transverse	1087
Forging machine. Smeralovy type LKL 400 horizontal	643
Forging press. Equipment on ram to vary the daylight on a Czechoslovak-built LKM 630	1379,1446
Forging press. ZDAS type LVH 2500-ton screw-type	645
Forging presses. Transfer equipment for	1154
Forgings, cropping, from a bar. Machine for Forgings. Progress in the production of large	476
Form tool. Wimet Econolock	1207
Forming. Developments in explosive	1080
Forming. Electrophoretic, of ceramic components	13
Forming. High energy-rate - some unusual applications	1424
Forming machine. Russian MEY electro-magnetic	378
Forming machine. Stretch-wrap, built by Travers Metal Products	417
Forming spur gear teeth and splines. Process for rapidly	1296
Forming, stretch. Some possibilities of radial forming technique. fluid, Fogg & Young press for applying the	71
Formlock tooling. Wimet	787
Forsyth Presses, Ltd.:	1317
Type V050 hydraulic press	1080
Foster, Dr. D., C.Eng., M.I.Mech.E., M.I.E.E., M.I.Chem.E.:	297
Automatic inspection for automatic assembly	102
Foster, Dr. K.:	
Fluidic circuits used in a drilling sequence control system	801
Foundry Developments, Ltd.:	
Fodel hydraulic gravity die casting machine	1220
Foundry equipment, British, in Hungary	290
Foundry & Metallurgical Equipment Co., Ltd.:	
British-built Croning shell moulding machines	590
Foundry. Modernization of Shipham	1224
Fransson & Brantemo AB:	
Type BH threading machine	697
Frech, Oskar:	
Die casting machines - their design and applications	1210
Type TP 630-20 die spotting press	1433
Freeman, M.H.:	
Shop floor angle checking to 1 min. of arc	989
Freewheel clutch. Stieber Mini	37
Friction sawing machine. Large Cave-Cut type 12-50	438
Friction welding machine. Rowland	865
Froerip, Maschinenfabrik, G.m.b.H.:	
Large mill-roll lathe	241
Machine building facilities	766
Frye Machine Tool Co., Ltd.:	
Exhibits at London International Engineering and Marine Exhibition	848
Film: Weiler lathe production	49
See also	696
Fry's (London), Ltd.:	
Enox No. 50 tool trolley	686
Fujitsu, Ltd.:	
Fanuc numerical control system 810,812,813,815	1436
Ful-Braze double-wall copper/steel brazed tube	212
Fuller Electric, Ltd.:	
Installation of modern machine tools	273
Fulton (TI), Ltd.:	
Handling 80-ft. long "bundles" of copper steel tube	1436
Funditor, Ltd.:	
Furnace, Monometer lip-axis tilting reverberatory	849
Furnace, New heat-treatment, for steel tubes	518
Furnaces. G.W.B. small heat treatment	1042
Furse, W.J., & Co., Ltd.	1268
Furmill cutter. Prolite 50-mm.	541
Fyna bench drilling machine	183
	1268

## G

GKN automatic capstan conversion system	1165
G.K.N. Engineering Equipment, Ltd.:	
Licence to build Ultimate robot manipulator 720	

	PAGE		PAGE		PAGE
GKN Screws & Fasteners, Ltd.: Heat treating 65 million screws per week Push-rod production	156 1130	Genevac, Ltd.: Feed-through collar and microcircuit jet	9	Grinding machine. Russian high-precision internal	313
G.W.B. Furnaces, Ltd.: Small heat treatment furnaces	1268	German machine tool industry. The Germany. The relations between research and industry in	1367 609	Grinding machine. Russian 6060 bearing ring	414
Gallicop automatic lathe. Mondiale	942	Gettys Manufacturing Co., Inc.: Electronic 3-dimensional copying equipment	1374	Grinding machine. Russian MB 13 B1 auto- matic tap relief	417
Gardner Denver Co.: True position tolerances for fasteners	1245	Gibbs Smith, A.J.: The German machine tool industry	1367	Grinding machine. Russian CA-15 2-spindle bearing	413
Gas Council: Exhibits at London International Engineer- ing and Marine Exhibition	861	Giddings & Lewis-Fraser, Ltd.: Extended activities	874	Grinding machine. Russian type 3671M surface grinding machine. Schleifmaschinenwerk Karl Marx Stadt type SA 315 by 630p n.c. cylindrical	826 976
Gas for industry. Natural	949	Globe Engineering Co., Ltd.: BISRA semi-automatic fine wire welding machine	1305	Grinding machine. Spandau Lindner type SJP 35 bore and face	1270
Gasmatic, SIF, type 175 MIG welding equip- ment	927	Gnitti Rotacyle machines. Batch produc- tion on	1190	Grinding machine. Toshiba HBG-50A spiral bevel gear	817
Gate-Omega No. 2 jig borer with Airmec Autoset numerical control system	267,885	Godhehere, A.R.: The Pryor E.P.70 electro-chemical marking machine	626	Grinding machine. Toyo Kogyo n.c. cam- shaft	814
Gating systems for pressure die casting. Central and aide	930,1388	Gold Star unit press tools	210	Grinding machine. A typical set-up on a Smart & Brown-Aldridge contour cutter	325
Gauge and Tool Makers Association: Trade luncheon	496	Gordon & Martin, Ltd.: Gorki type 1265 PM-6 six-spindle chucking automatic	418	Grinding machines. Abwood-Contelyt electro- lytic surface	832
Gauge for continuously measuring the thickness of a moving strip. Solex Cee	1163	Gorres, Peter: PEGO welding equipment	927	Grinding machines. Utilization of cylindrical grinding. roll. New Norton wheels for	603 702
Gauge. New form of hot-rod diameter	1299	Gottwaldov types RPN and SPK 25 n.c. turret lathes	243,244	Grinding. slideway. Litton's increased capacity for	306
Gauge. Rok-It spherical bore, and Carb-O- rip chuck jaw inserts	248	Grading machine. Schenck fully-automatic balancing, correcting and, for small rotors	1157	Grinding at very high speeds with abrasive wheels	65
Gauges. New Baty dial snap	826	Gratings. Angle comparator incorporating diffraction	989	Grinding wheel balancing equipment. Balatron electronic	1266
Gauging equipment. Dimensionair	1205	Gray-Camling, Ltd.: Magnalux M portable lamp	1313	Gripping pieces for 3-jaw chucks. S-P circular	300
Gauging. Set-up to demonstrate multi-station air, and electric indicating and recording	497	Tilt 'R' positioning unit	1352	Grit-blasting machine for automatic removal of flash from plastics parts	76
Gauging. The place for optical, in modern manufacture	574	Greenlee Tool Co.: Piercing units	1094	Grooves in rolls. grinding. Johanssons type 2U-F machines for	536
Gear blanks. Russian link-line for machining	569	Greenwood & Batley, Ltd.: Automatic bolt pointing machine	825	Grooves. Producing large radius, with a smaller cutter	625
Gear components. Production of annulus, on Sykes machines	439	Griffiths, Samuel, (Willenhall) Ltd.: 20-ton power press with safety guard presented to Birmingham Industrial Safety Centre	809	Group Technology. The growing acceptance of Grumman Aircraft Engineering Corp.: Developments in explosive forming	13
Gear cutter. Russian-built instrument	319	Spherelease de-jamming arrangement for power presses	880	Guard equipment. "Electronic" Proximitor.	23
Gear deburring machine. Tiki	596	Grimston Electric Tools, Ltd.: Drilling machine with multiple type 1B spindle heads	96	Guarding system for press brakes. Udal photo- electric	630
Gear generators. Line of 14 Sykes vertical, at Leyland works	439	Grimston-AEI type 4530 n.c. co-ordinate table on Hungarian heavy-duty radial drilling machine	1044	Guillotine shearing machine. A proposed design for a combined press brake and	595
Gear grinder. Toshiba HBG-50A spiral bevel gear hobber. Russian-built high-accuracy	817 316	Grinders. Brierley Mark III drill	1098	Guillotine shearing machine. B.R.G. French- built type 3000 A	915
Gear hobbing machine. David Brown large capacity	1328	Grinders. Wallace raised-hub cut-off wheels for portable	400	Guillotine shearing machine. Keetons Hydro- Cut 1/4-in.	913
Gear lubricants in aerosol dispensers.	580	Grinding. Centreless taper, at the works of Redcar Engng. Co.	1082	Guillotine shearing machine. Ste-Co hydraulic Gun reaming in valve production. Applications of	919 689
Gear shaper cutter grinder. Russian-built	517	Grinding machine. Abwood type ASG-1 Mk. 11 vertical spindle surface	144	Guy-Raymond Engineering Co., Ltd.: Dial feed unit on Cressex power press	1375
Gear shaping machine. Schies, set up for cut- ting teeth in the coupling ring of Allen- Stockicht epicyclic gear	946	Grinding machine. Elliott Milnor 20 by 8-in. hydraulic surface	1056		
Gear shaving machines. TOS-Celakovice type OS 12	640	Grinding machine. Ellis type 1/60 belt	1102		
Gear teeth and splines. Process for rapidly forming spur	71	Grinding machine. Mikromat SWPO 80 n.c. polar co-ordinates profile	1085		
Gear teeth. Branson probe for testing hardness of	1106	Grinding machine. NELL cylindrical, with oil hydraulic elements	827		
Gear teeth. measurement of involute.	459,773,899	Grinding machine. Newall type AHAC automatic crankshaft	1051		
Gear testing instruments. Zeiss	358	Grinding machine. Newall unit-type, with automatic work handling equipment	1419		
Gear units. Computer-designed David Brown	432	Grinding machine. Overbeck type 250R cylindrical	1321		
Gears. camshaft, Lees-Bradner type 7HDD VI 6-spindle hobbing machine for	472	Grinding machine. Russian-built gear shaper cutter	317		
Gears. Induction hardening of large	888				
Gears. Multi-start hobbing of	10				
Gears. shaping spur. Optimum feed rates in Gears. spur and helical. Zeiss equipment for measuring the base pitch of	1404 549				
Gears. Stachely skiving process for cutting internal	12				
Gearable, Ltd.: Programme control equipment and bar feed unit for capstan lathes	433				
Gearbox cover. Die cast	424				
Gearbox shaft. Operations on a, on a Conomatic 6-spindle chucking automatic	362				
Gearbox test rig. David Brown	796				
Gearbox. Varatito 75-speed	1167				
Gearboxes, spur reduction, and power take- off units for tractors. Production of	1288				
Geco Export Co.: Type SP hydraulic straightening press	148				
General Dynamics Corporation, U.S.A.	1147				
General Electric Co., U.S.A.: Mark Century 100B numerical control system	139				
Mark Century 100S numerical control system for oxy-cutting machines	131				
Mark Century 100S type III continuous- path control on Dean, Smith & Grace lathes	1004				
Services Shop Department: Applying n.c. equipment to existing machines	1091				
General Motors Corporation: Data for Accurad die casting	708				
Allison Divn.: Jet wheel-cleaning facilitates grinding of certain alloy materials	354,557				

	PAGE		PAGE		PAGE
Hardness testing. Developments in	1409	Hutchi, Ltd.		Hydrostatic bearings. Transfer machine	
Hardness testing machine. Dawe type 1851		7060 n.c. 2-spindle milling machine . . .	812	performance improved with . . . . .	984
ultrasonic . . . . .	95	Hobbing installation for starter rings. Liebherr		Hydrostatic drive systems. Developments in,	
Hardness testing machines. Reicherter . . .	807	automatic . . . . .	238	at the National Engineering Laboratory . .	291
Hardness tests on curved surface. Correction		Hobbing machine for camshaft gears. Lees-		Hydrostatic extrusion developments . . . . .	751
factors for Vickers . . . . .	587,773	Bradner type THDD VI 6-spindle . . . .	472	Hydraulic Engineering Co., Ltd.: . . . . .	
Hardness work-holding fixture for production		Hobbing of gears. Multi-start . . . . .	10	Exhibits at London International Engineer-	
milling machines . . . . .	1160	Hoburn Aero Components, Ltd.: . . . . .		ing and Marine Exhibition . . . . .	925
Harland & Wolff, Ltd.: . . . . .		Production of spur reduction gearboxes		Hyster, Ltd.: . . . . .	
Danly presses built under licence from		and power take-off units for tractors . .	1288	Economies obtained with Cintimatic n.c.	
U.S.A. . . . .	960	Holder. TR circuit board . . . . .	490	machines . . . . .	184
"Harmonic Drive" power transmission system		Hole-Master. Wallace 4000 series . . . . .	1324		
Harris, K. Dillon, B.Sc., A.Inst.P.: . . . .	760	Holes in pipes. Trepanning, Wallace 4000 series			
Application of lasers to distance measure-		Hole-Master for . . . . .	1324		
ment . . . . .	1369	Holes in tubes. Meddings machine for drilling			
Harrison, T.S., & Sons, Ltd.: . . . . .		Holroyd, John, & Co., Ltd.: . . . . .	1416		
15-in. swing lathe . . . . .	1267	Machine for milling keyways and slots in			
Milling machines - some aspects of their		large shafts . . . . .	296		
manufacture . . . . .	1353	Verso 2 5/8-in. centre speed reducer . .	377		
Hartford Special Machinery Co.: . . . . .		Honeycomb materials. Machining masters			
Robertson-Hartford thread-rolling machine		made from plastics-filled . . . . .	1358		
Hartley, Max, Ltd.: . . . . .	887	Honeywell, Inc.: . . . . .			
Type 210A hydraulic press brake . . . .	919	4-way rotary switches and push buttons on			
Hartwell WASP system . . . . .	128	control panel of Vero grinder . . . . .	540		
Hasenclever 4000-ton hydraulic screw press		New KB modular keyboard system of			
Hatch, George, Ltd.: . . . . .	407	display switching . . . . .	541		
Large rotating centre . . . . .	1189,1281	Honeywell Controls, Ltd.: . . . . .	541		
Havart billet cutting-off and die splitting		Honing jig bush bores . . . . .	5		
band-sawing machine . . . . .	806	Honing machine. Raybrook type 350 . .	824		
Hawker Siddeley Dynamics, Ltd.: . . . . .		Hoover, Ltd.: . . . . .			
Fluid coupling . . . . .	1370	Installation of Ferranti 3-dimensional			
Verstutten licence agreement . . . . .	216	inspection machine . . . . .	380		
Hawley, John, & Co. (Walsall), Ltd.: . . .	1102	Hopkins Gear Services, Ltd.: . . . . .	239		
Hayters, Ltd.: . . . . .		Hopper unit. Valley elevator and			
Mighty Midget 250D transportable diesel-		Hoses. Omnibutes flexible seamless metallic			
engine welder . . . . .	866	Hot forging installation. Automated . .	748		
Headland, Thos. F., (Machine Tools) Ltd. .	473	Hot piercing tubes by a 3-roll technique .	253		
Headland, Thos. F., Ltd.: . . . . .		Hot pressing. Beryllium billets produced by	258		
Stayrite patented precision vice . . . .	911	Hot riveting machine. Hirst Electric	1078		
Heads. Dex multi-spindle. Involute splines in		Industries . . . . .	1251		
Heald Machine Co., U.S.A.: . . . . .	769	Hot rod diameter gauge. New form of . .	1299		
Bore-Matic type 622A horizontal boring		Howard, Stanley, Ltd.: . . . . .	1270		
machine . . . . .	1048	Machine tool exhibition . . . . .			
Heat-treating 65 million screws per week .	156	Howell & Co., Ltd.: . . . . .			
Heat-treatment furnace for steel tubes. New		Howco-Fin finned tubes and arrangements			
Heat-treatment furnaces. G.W.B. small . .	1268	for their production overseas . . . . .	771		
Heater. Cromack air . . . . .	327	Howco-G-Fin finned tubes for oil refinery	598		
Heating elements. Watlow . . . . .	541	Howes, H.E.: . . . . .	1154		
Heating equipment for heat-treating welded		Hrazdil, F.: . . . . .			
joints in pipelines. AEG-Eloterm 20-kW		High energy-rate forming - some unusual			
Induction . . . . .	999	applications . . . . .	378		
Heckert programme-controlled milling machine		Hub components. Steinel rotary transfer			
Heginbotham, Prof. W., B.Sc., Ph.D., C.Eng.,	886	machine for drilling and tapping . . . .	688		
M.I.Mech.E., M.I.Prod.E.: . . . . .		Humphries & Sons, Ltd.: . . . . .			
Things to come in mechanized assembly		Precision cut-to-length lines . . . . .	495		
Hektor lathe equipped for automatic copy		Hungarian machine tools. Exhibition of .	41		
turning. Weisser . . . . .	1263	Hunter, G. (London), Ltd.: . . . . .	1274		
Hennig, P.T.: . . . . .		Services lift table . . . . .			
Method of sizing and deburring set screws		Hupfield Bros., Ltd.: . . . . .			
Hepworth Iron Co. (Engineering), Ltd.: .	1161	Application of Enots multi-point lubrica-			
Versa-Trace copying equipment on a		tion system to injection moulding machines	662		
Swift type 25DR roll-turning lathe . . .	1142	Hure, Leon, and Etaps. P. Hure: . . . . .	1060		
Herbert, Alfred, Ltd.: . . . . .		Merger of the two companies . . . . .			
Auto-Robot control for No. 0 capstan . .	750	Huron type MU6 CNP n.c. milling machine.			
Exhibits at London International Engineer-		Set-up on . . . . .	264		
ing and Marine Exhibition . . . . .	853	Huron type MVP 50 vertical milling machine	1060		
No. 0 capstan lathe converted for automatic		Hy-Pro hydraulic power packs . . . . .	32		
working by means of Ether programme		Hybormill seminars . . . . .	1277		
control equipment . . . . .	189	Hybormill type 70a n.c. borer. Giddings &			
1.5 million dollar orders from U.S.A. for		Lewis-Fraser . . . . .	876		
Herbert/DeVlieg jigs and		Hydapress hydraulic press brakes. Elpa . .	262		
Plastics injection moulding machines at		Hydraulic cylinders with built-in limit switches.			
Kodak Ltd. . . . .	593	Tomkins-Johnson air and . . . . .	36		
See also . . . . .	150,1048	Hydraulic equipment for programmed forging			
Herbert-BSA (Cutting Tools), Ltd.: . . .		press installation . . . . .	832		
New range of throw-away tip turning tools		Hydraulic gravity die casting machine. Fodel	1220		
Herbert-BSA, Ltd.: . . . . .	550	Hydraulic guillotine shearing machine. Ste-Co	919		
Type SCM single-spindle chucking automatic		Hydraulic motor. Staffa Mark 16 10-cylinder			
Herbert, Edward G., Ltd.: . . . . .	1102	hydrostatically-balanced . . . . .	856		
Rapid 2000 series hacksawing machine		Hydraulic power packs. Hy-Pro . . . . .	32		
Hestair Sherpa, Ltd.: . . . . .	97	Hydraulic press brake. Bronx 1000-ton . .	532		
Sherpa fork-lift truck for handling press		Hydraulic press brake. Kingland-AEL 150-ton			
tools . . . . .	1379	downstroking . . . . .	916		
Sherpa 50/54 lifting table . . . . .	1357	Hydraulic press brake. Max Hartley type			
Heurichrome S.A., Paris . . . . .	970	210A . . . . .	920		
Hi-Promatic multi-operation numerically-		Hydraulic press. Bronx 50-ton . . . . .	20		
controlled machine. H.P.E. . . . .	16,437	Hydraulic press for pointing tubes. Wecker			
Hi-Syn synchro-position transducer . . .	1197	Hydraulic press. Forsyth type V050 . . .	297		
High energy-rate forging on a Dynapak		Hydraulic Projects, Ltd.: . . . . .	32		
machine. Examples of . . . . .	1147	Hy-Pro hydraulic power packs . . . . .	35		
High energy-rate forming - some unusual		Hydraulic pumps. Dynex . . . . .	407		
applications . . . . .	378	Hydraulic screw press. Hasenclever 4000-ton	148		
High Precision Equipment, Ltd.: . . . . .		Hydraulic straightening press. Geco type SP			
Hi-Promatic multi-operation n.c. machine		Hydraulic valve. Vickers-Detroit miniature			
Hi-Promatic multi-purpose n.c. machine		solenoid-operated . . . . .	37		
Hindustan Machine Tools, Ltd.: . . . . .	16	Hydraveral hydraulic shear. Rhodes . .	297		
Film: Mother machines . . . . .	1232	Hydro-Cut guillotine shearing machine .			
Hirst Electric Industries, Ltd.: . . . . .		Keetona 1/4-in. . . . .	913		
Hot riveting machine . . . . .	1251	Hydro-pneumatic squeeze press. Payne			
		Semblamatic . . . . .	1052		
				IBM Systems Manufacturing Division:	
				Computer simulation to facilitate	
				manufacturing planning . . . . .	631
				IDM Electronics, Ltd.: . . . . .	
				Hi-Syn synchro-position transducer . . .	1197
				I.F.A.C. blind captive nuts . . . . .	34
				IMC Magnetics Corp.: . . . . .	
				Stepping motors . . . . .	762
				INA Needle Bearings, Ltd.: . . . . .	
				Low-speed heavy-duty roller bearing . .	549
				I.V. Pressure Controllers, Ltd.: . . . . .	
				Pneumatic spool valves . . . . .	761
				Ilyich type LZ-113 bearing track super-	
				finishing machine . . . . .	318
				Ilyich Grinding Machine Works, Leningrad.	
				Impact forming die cavities . . . . .	231
				Impact forming die cavities . . . . .	379
				Impact tool for loosening and tightening nuts.	
				Atlas Copco . . . . .	1405
				Impactor automated hot forging machine.	
				Chambersburg . . . . .	253
				Impellers, Multiple-milling of, on Bridgeport	
				machines . . . . .	255
				Imperial Chemical Industries, Ltd.: . .	
				Joining detonators to lengths of safety	
				fuse on a crimping machine . . . . .	124
				Imports. British machine tool \$5,164,277,443,502,	
				587,839,1068,1339,1445	
				Classified: . . . . .	
				and facing pages 1120,1284,1392	
				Improdex, Ltd.: . . . . .	1047
				In-line transfer machines for wrist watch	
				cases . . . . .	1236
				Inch and metric reading dial indicators. Buty	
				inches and millimetres. Fearn calculator for	1185
				conversions between . . . . .	1418
				Incontra & Weninger: . . . . .	
				Ingers-Profilross hydraulic copy milling	
				machine . . . . .	666
				Ingers V3 vertical milling machine . . . .	666
				Indexing and dividing tables. Driss . . . .	605
				Indexing fixture for Alcol Rotamill machine	1385
				Indexing fixture and drilling attachment. Tebo	475
				Indexing table. Enots rotary . . . . .	151
				Indexing table. Fibrotakt . . . . .	863
				Indexing tables. Moore precision rotary and	1101
				Indian film on machine tool making . . .	1232
				Indicator. Clayton type 821 rotary position	860
				Induction hardening equipment for bedways.	
				Russian . . . . .	565
				Induction hardening machine for camshafts.	
				Russian . . . . .	454
				Induction hardening of large gears . . . .	888
				Induction hardening of spindle-type parts.	
				Radnye machine for . . . . .	873
				Induction heating equipment for heat treating	
				welded joints in pipeline. AEG-Eloterm	
				20-kW . . . . .	999
				Induction heating equipment. Set-up for seam	
				welding tubing with Delapena . . . . .	864
				Industrial (Anti-Corrosion) Services: . .	
				Fernox DW 66 strippable plastics coating	403
				Industrial Control Systems, Ltd.: . . . .	
				Demonstration of GKN automatic capstan	
				conversion system . . . . .	1165
				Industrial design of Russian machine tools .	907
				Industrial Electronic Controls (Manchester),	
				Ltd.: . . . . .	
				Vibraswitch for protection of machinery	127
				Industrial Fastening & Automation Consultants,	
				Ltd.: . . . . .	
				Blind captive nuts . . . . .	34
				Infeed rates in shaping spur gears. Optimum	1404
				Infra-red oven. Coneyorized . . . . .	105,276
				Ingers-Profilross hydraulic copy milling machine	666
				Ingers V3 vertical milling machine . . . .	666
				Injection moulding machine. Large Japanese	
				plastics . . . . .	835
				Injection moulding machines at the works of	
				Kodak Ltd., Herbert plastics . . . . .	593

	PAGE
Injection moulding machines. Hupfield, Enots	662
multi-point lubrication system for	102
Inspection. Automatic, for automatic assembly	
Inspection and de-saming lines in a steelworks.	758
Highly mechanized	748
Inspection of blanks. Automatic	404
Inspection equipment for pistons. Micromatic	380
automatic	477
Inspection machine. Ferranti 3-dimensional	375
Inspection. Read-out equipment applied to	
Inspection of seam-welded tubing. Automatic	1201
Inspection of tube welds. Equipment for	
oddy current.	1360
Inspection of variable-pitch cams for zoom	
lenses. Automatic high-speed	563
Inspection. Use of optical projectors for	
routine	1350
Instabake safety equipment for drilling	
machines	104
Instruction in electronics. Peto Scott equip-	
ment for progressive theoretical and	831
practical	
Instruction in numerical control. Experimental	1194
unit for	319
Instruction of production line workers. Audio-	
visual system for	38
Instrument gear cutter. Russian-built	
Interferometric measuring systems. Matrix	1221
jig borer with diffraction grating and	998
Interlas, Ltd.	
Equipment for fine wire welding.	
Exhibits at International Welding Exhibition	211,485,801
International Business Machines:	
Application of a computer to cost estimating	178
International Fluid Logic Conference and	
Exhibition. Second	211,485,801
International General Electric Co. of New	
York, Ltd.	
Mark Century 100M numerical control	890
system	131,139
See also	
International Steel Co.:	
Automatic girder drilling installation	265
International Tin Research Council:	
Tin as an aid to the sintering of iron	1165
powder	864,926,997
International Welding Exhibition	
Intertherm, Ltd.:	
Screwdriver blade hardening equipment.	437
Investment casting patterns. Russian rotary-	
table wax-injection machine for	1017
Investment casting. Rubber dies for wax	
patterns for small-quantity	635
Invoicing computer. Savings obtained with a	
SADIE	1206,1332
Involute gears. Measurement of	459,773,899
Involute splines in Dex multi-spindle heads	769
Iodine in lubricants. Results obtained with	584
iron casting capacity at Follis-Waycliffe	
foundry. Expansion of	1040
Iron powder. Tin as an aid to the sintering of	1165
Iron. Super-malleable	1359
Ishikawajima-Harima Heavy Industries Co., Ltd.:	
Large plastics injection moulding machine	835
Isostatic powder compacting press. Laboratory	1313
Isostatic press for the production of Ferro-	
Tic blanks. Large	986
Isostatic pressing equipment	66
Itoh, C., Ltd.	810

Jackman, R.D., M.A.:	
Controlling modern flying shears	743
Jagenburg coating plant. Leonard Seie install	1386
Japanese horizontal boring and milling machine	298
Japanese injection moulding machine. Large	835
Japanese machine tool developments	810
Japanese universal turret milling machine	146
Jaywood Electroplating Co., Ltd.:	
Installation of Canning plant for barrel or	
rack plating	805
Jenček, L.:	
Central and side gating systems for pressure	
die casting	930,1388
Sand castings and gravity die castings	
re-designed for pressure casting	422
Jet wheel-cleaning facilitates grinding of	
certain alloy materials	354,557
Jig boring machine with diffraction grating	
and inter-ferometric measuring system.	38
Matrix	
Jig boring machine. Gate-Omega No. 2, with	
Airmec Autoset n.c. system	267,885

Jig boring machine. Mikromat type BKoE 315	548
by 200, with Zeiss optical system	
Jig boring machine with position pre-selection	314
arrangements. Russian	
Jig boring machine. Russian type 2B 440P	77
n.c.	121
Jig boring machines. Sverdlow	663,834
Jig erosion machine. Newall-AGIE type	401
1520-75K	328
Jig microcircuit. Feed-through collar and	
jigs and fixtures. W.D.S. standard parts for	536
Jigmill. 1.5 million dollar orders from U.S.A.	27
for Herbert/DeVlieg	1232
Johansson Press-Och Hejarverktyg AB:	
Type 2U-F machine for grinding grooves	798
in rolls	
Joints. torque testing. Equipment for	718
Film: Lathe tools	1420
Jones, A.A., & Shipman, Ltd.:	
Installation of shot-blasting plant for	
machine tool castings	847
New tool pre-setting and measuring	819
equipment	1046
"Universal" fixtures and auxiliary	
equipment for n.c. machines	
Jones & Attwood, Ltd.:	
Worcester 25-ton ungeared power press.	
Jones & Lamson films. New	
Jones, Sidney G., Ltd.	

## K

K. & L. Steelfounders & Engineers, Ltd.	657
KIPPS computer programme	606
KSM Stud Welding, Ltd.:	
Autoweld arc stud welding machine	928
Kalinin Sewing Machine Factory:	
Production of sewing machines	1016,1124
Karl Roll Apparatebau:	
Vapour degreasing unit	1264
Kayser Ellison & Co., Ltd.:	
New London warehouse	1387
Kayser, J.G., G.m.b.H.:	
National Kayser transfer equipment for	
forging presses	1154
Kearney & Trecker-C.V.A., Ltd.:	
Clean room for assembly of British-	
built Milwaukee-Matics	1309
Special milling machine with sequence-	
controlled work-handling equipment	236
See also	1108
Kearney & Trecker Corp., U.S.A.:	
Milwaukee-Matic Series IIB machining	
centre	1107
Keams, H.W., & Co., Ltd.:	
Development of 3-axis machining centre	1326
Keetona Hydro-Cut 1/4-in. guillotine	
shearing machine	913
Kelco Automation, Ltd.:	
Exhibits at London International	
Engineering and Marine Exhibition	917
See also	1049,1265
Kelly, Robert, & Sons, Ltd.:	
Machine tool demonstration at new	
showroom	885
Kendall & Gent, Ltd.:	
Vertical milling machine with Plessey	
numerical control	987
Kerry's (Gt. Britain), Ltd.:	
Exhibits at E.I.A. Yorkshire Region	
Exhibition	826
See also	348,458,686,796,909,1023,1129,1244
Keuro automatic circular sawing machine	698
Keyways and slots in large shafts.	
Holroyd machine for milling	296
Kidsgrove Incremental Parts Programming	
System	606
King, John, & Co. (Leeds), Ltd.:	373
Kingfisher (Lubrication), Ltd.:	
Pipe-line delivery system for workpieces	699
Kingsland Engineering Co., Ltd.:	
Kingsland-AEL 150-ton hydraulic down-	
stroking press brake	916
Kingston quality and reliability	
exhibition	497
Kinnis & Brown Group:	
Sudbury wet-metal protector	38
Kipp, Heinrich:	
Adjustable clamping levers	1357
Kirov MP-188 automatic bearing broach	82
Kirov type 2B 420 jig borer with position	
pre-selection arrangements	314
Kirovokan spark erosion machines	192
Kistler Instruments AG:	
Balantron electronic grinding wheel	
balancing equipment	1266

Klinger, Richard, Ltd.:	
Valve made from PTFE	912
Kodak, Ltd.:	
Installation of Herbert plastics injection	
moulding machines	593
Koedam, Dr. M.:	
Laser equipment for diffraction measure-	
ment of small dimensions	1186
Kole International Inc.:	
Kole Bin corrugated cardboard storage	
containers	541
Komsomolets type E3-32 round file cutting	
machine	420
Koping type ANC machining centre	471
Kramatorsk machine for grinding bores of	
spindles from both ends simultaneously	123
Krasny Proletari Works:	
Large volume production of lathes	676
Multi-spindle vertical automatics	453
Krupp automatic duplex slitting machine	
demonstration	1440
Krupp transfer presses	1100
Kuenkel Wagner fully-automatic moulding	
machine	1224
Kulmann Standard L drafting machine.	
Orlad	30
Kumla PV5 initial-pinch bending rolls	848
Kuraki type KBT-602 horizontal boring	
and milling machine	298

## L

Laboratory isostatic powder compacting	
press	1313
Ladle. Monometer I-man transfer, for	
distribution of molten aluminium in	518
founuries	1089
Lamination plant. Erfurt stator and rotor	
Lamp. Magnalux M portable	1313
Landis Machine Co.:	
Life of forming rolls	636
Landis Machine-Maiden, Ltd.:	
"Portable" 10 transportable spot welding	
equipment	997
Langham Tools, Ltd.:	
Baier facing and centring machine	699
See also	1094
Langley Alloys, Ltd.:	
Exhibits at International Welding	
Exhibition	997
Langsett Machine Tools, Ltd.:	
View of showroom	1226
Lapmaster lapping machine. Redesign	
48-in.	1275
Lapmaster machine set up for finishing the	
faces of 7-cylinder barrels for Taurodyne	772
hydrostatic tractor transmission	607
Lapping compounds. Timesaver	
Lapping machine for flat surfaces.	532
Flexibox type 40A	
Lapping machine. Redesign 48-in.	
Lapmaster	1275
Laser equipment for diffraction measurement	
of small dimensions	1186
Laser micro-machining	1201
Lasers. Application of	507
Lasers. Application of, to distance measure-	
ment	1369
Lathe. Accuratool 1-in. automatic capstan	693
Lathe. Accuratool automatic capstan, set	
up for producing blanks	1383
Lathe. Burnett Granville Star 4-in. centre	824
Lathe. Churchill-Denham's, arranged for	
taper turning with combined feeds	1043
Lathe. Clover type 18/26 centre	1049
Lathe conversion equipment. GKN auto-	
matic capstan	1165
Lathe. Craven 72 1/2-in., installed at works	
of English Steel Forge & Engineering	775
Corps.	1044
Lathe. Cressex type 150/800 centre	
Lathe. Czechoslovak type SPN 12	
numerically-controlled	242
Lathe. Dean Smith & Grace n.c. design	
background and programming	1109
Lathe. Elliott Concord, of "cubed"	
construction	1055
Lathe. Elliott Omnispeed centre, turning	
cast iron on an	266
Lathe. Harrison 15-in. swing	1267
Lathe. Hungarian type RT 80 turret	43
Lathe. Large Forrier mill-roll	241
Lathe. Leifeld type P1b 1800 spinning	1048
Lathe. Mafumast DF 315 num. chucking,	
with numerical control	979
Lathe. Mondiale Gallicop automatic copying	942
Lathe. Myford type ML.7T 3 1/2-in. centre	910



	PAGE		PAGE		PAGE
Lathe. Pontoglio type TO 450 hydraulic copying	1265	Lines. precision cut-to-length, Humphris	495	Machine tool developments. Czechoslovak	242
Lathe. Scheer DXWK 630 by 4000 n.c. roll-turning	1083	Lines. Russian link	677	Machine tool developments. Japanese	810
Lathe. Swift type 25DR roll-turning	1142	Linear dividing machine. Russian type MC-18M	81	Machine tool exhibition. Pugsley	266
Versa-Trace copying equipment on a	1142	Linear transducer for measurement of slide positions on machine tools	1196	Machine tool exhibition. Russian	77,192,312,413
Lathe. Weisser Hektor, equipped for automatic copy turning	1263	Linear transducers. Boulton-Paul	301	Machine tool exhibition. Stanley Howard	1270
Lathe. Zerbst type DP 630 num. numerically-controlled facing	547,982	Linking tumbler barrels. Use of Flexane for Link-line for machining gear blanks. Russian	64	Machine tool export prospects to Canada	359
Lathes. capstan, Geraide programme control equipment and bar feed unit for	433	Link lines. Russian	677	British	647
Lathes. Dean Smith & Grace introduce tape-controlled	1001	Linked assembly aid machines. Transarm twin	73	Machine Tool Industry Research Association: Annual report	1172
Lathes. Gottwaldov types RPN 63 and SPK 25 numerically-controlled turret	243	Linked line for turning rocker shaft components	752	Design of alignment test bars	1278
Lathes. Large volume production of, at the Krasny Proletarii works	676	Linotype & Machinery, Ltd.	1152	Utilization of cylindrical grinding machines	603
Lathes. Niles DRT programme-controlled drum turret	1086	The Mergenthaler Diagrammer	306	Machine tool industry. The German	1367
Lathes. production efficiency of centre, Digitum - a system for improving the	1180	Litton's Machine Tool Co., Ltd.	1200	Machine tool orders	219,271,1227,1391
Lathes. small-capacity capstan, Ether programme control for	189	Increased capacity for slideway grinding	306	Machine tool re-building by Newman Industries	359
Lathes. Unit construction of	349	Load cell. Automatic Timing & Controls series 6004	540	Machine tool situation. The	3,1179
Leaf chains. Rex	373	Load cell. BISRA 50-ton	1238	Machine Tool Trades Association: Joint statement with Swiss Association of Machinery Manufacturers	1114
Lectroetch (Gt. Britain), Ltd.: Portable marking unit	1144	Loading and storage equipment for wrist watch cases. Automatic	1238	Machine Tool Standards Panel	950
Lee, F.W., (Industrial Equipment), Ltd.: Universal bench vice	1269	Loewy Robertson Engineering, Ltd.: 3-roll tube piercing mill	258	President's speech at annual general meeting	723
Lee-Bradner Co.: 7HDD VI 6-spindle hobbing machine for camshaft gears	472	Logic card assemblies. Trend	151	Presentations to machine tool scholars	272
Leifeld type P18 1800 spinning lathe	1048	Logic, fluid, computer. Univac	800	Sources of standards information for machine tools and allied equipment	67
Leipzig Spring Fair. East German machine tools at	547,975,1083	Logic, fluid, Conference and Exhibition. Second International	211,485,801	The need to stimulate demand for machine tools	1388
Leningrad Group of Machine Tool Factories. Activities of the	116	Logic, fluid, control equipment on Czech eccentric press. Aro	1377	Machine tool trial period scheme now in operation	1169
Lenses. zoom. Automatic high-speed inspection of variable-pitch cams for	1360	Logic, fluid, control equipment. New Maxam turbulence amplifier for	40	Machine tool units. Tangram	349
Letters to the Editor: Application of a Petro-Forge machine to high-speed shearing operations	274	Logic, fluid, diode. Input/output performance curves for forward and reverse flow of the "Aviation Electric"	211	Machine Tools (Northampton), Ltd.: Havart billet cutting-off and die splitting band sawing machine	806
Central and side gating systems for pressure die casting	1388	Logic, fluid, elements. Design and manufacture of pure	485	Machine tools. Pre-production orders for	903
Correction factors for Vickers hardness tests	773	Logic, fluid, experimental kit	1059	MACHINERY AND PRODUCTION ENGINEERING circulation certificate	330
Design of alignment test bars	1278	Logic, fluid, Is full advantage being taken of	171	Machining centre. Keams develop 3-axis	1326
Measurement of involute gears	773,899	Logic, fluid, system for safety control. Maxalog	124	Machining centre. Koping type ANC	471
Numerical control without feedback	47	Logic, fluid, units. Industrial scale manufacture of pure, from acrylic material by a special casting process	486	Machining centre. Milwaukee-Matic Series IIIB	1107
What is a machining centre?	495	Logic, fluid, units. Plessey	212	Machining centre. What is a	339,495
Lewers. Kipp adjustable clamping	1357	Logic system. Aro pneumatic	821	Machining centre. Clean room for assembly of British-built Milwaukee-Matic	1309
Lewis, Frank, (London), Ltd.	299	London International Engineering and Marine Exhibition	844,910,992,1374	Machining centres. Vero 15/24-1000 series n.c. turret	162
Leyland Motor Co., Ltd.: Installation of 12 Ryder No.8 Verticalautos Line of Sykes gear generators for production of annulus gear components	611	Loosening and tightening nuts. Atlas Copco impact tool for	1405	Machining. Contour, by means of point-to-point n.c.	637
Liebherr, Hans: Automatic hobbing installation for starter rings	238	Lorant Engineers, Ltd.	1357	Machining gear blanks. Russian link-line for	569
Life of forming rolls	636	Low pressure die casting. Developments in Lowry, W.L.: Large capacity electrochemical machines	1417	Machining hard rubber components. Use of diamond tools for	692
Lift Table. Hunter service	1274	Lubricant. Duckhams Adopt dry-film	1151	Machining. High-precision abrasive	466
Lifting table. Sherpa 50/54	1357	Lubricant. Rocol D.F.S.M. dry-film	458	Machining masters made from plastics-filled honeycomb material	1358
"Light wire" kit. Bausch & Lomb experimental	539	Lubricant-spraying equipment. Clark's Precision	17	Machining operations. Copy, on a complex thin-walled component	132
Lighting poles of octagonal shape	539	Lubricants, Castrol open gear, in aerosol dispensers	580	Machining operations facilitated with Rocol soluble oil	519
Protemcam 100-ton capacity hydraulic press brakes set up for production of tapered street	1439	Lubricants. Results obtained with iodine in Lubrication for Adcock & Shipley machines. Centralized	584	Machining operations on rocker shaft components	752
Limit switching unit. Brookhirst Igranit	531	Lubrication system. Enots multi-point, for Hupfield injection moulding machines	662	Machining service. n.c. A sub-contract	820
Limotique Valve Controls, Ltd.: Zero Four electric valve actuator	70	Lubricator. Oil-Fog	857	MacLean Engineering Co.: Series 250 high-speed nut tapping unit	480
Lincoln Electric Co., Ltd.: Automatic welding machine for production of scaffolding props	1035	"Lubricator. Radial"	992	Macreedy's Metal Co., Ltd.: Exhibits at London International Engineering and Marine Exhibition	861
Super-Sprite semi-automatic CO <sub>2</sub> welding unit	928	Lucas Engineering Review: Application of lasers to distance measurement	1369	Magdeburg VEB Werkzeugmaschinenfabrik: Mafumat DF 315 num. chucking lathe with numerical control	979
Line diagrams produced by automatic projection equipment	1152	Ludor type IV vertical milling machine. Cressex	851	Magnalux M portable lamp	1313
Line. Hall multiple-weld transfer, for the Viva underbody	599	Lyons, R.V.: Transfer machine performance improved with hydrostatic bearings	984	Magnatox type 1671/1 semi-automatic crack detector. Esab	873
Line. Link, for machining gear blanks. Russian	569	Lysaght Works: Installation of highly-mechanized inspection and descaling lines	758	Magnesium die casting	1216
Line. Linked, for turning rocker shaft components	752			Magnetic Devices, Ltd.: Timing units with "cuttable" cams	305
Line. New Dandy press, at Ford Halewood works	961	MAS type SPW 12 numerically-controlled lathe. Czechoslovak	242	Magnetic visual display panel	1373
Line. New Ford door assembly	508	MC Machines, Ltd.	695	Magnifier. Dazor type M 209 floating	1316
Line of 14 Sykes vertical gear generators at Leyland works	439	M.E.L. Equipment, Ltd.	1326	Mains distribution unit. "Applied Electronics"	127
Line. Russian roller bearing production	413	MEY electro-magnetic forming machine. Voronezh	417	Makino Milling Machine Co.: MCP-70 n.c. horizontal boring machine	811
Line. sheet slitting, Crompton Parkinson drive for a	143	MMT abrasive-wheel cutting-off machine	1262	Malleable iron casting capacity at Follisain-Wycliffe foundry. Expansion of	1040
Line straightness. Measurement of	591	MTTA Standards Organization	67	Mandrel. Roberts tube bending	695
Lines. Buhr transfer, for the production of pump components for an exhaust gas control system	542	"Machine minder". Photain automatic	35	Manipulator. GKN Unimate robot	720
Lines, inspection and de-seaming, in a steel-works. Highly-mechanized	758	Machine Tool Agencies, Ltd.	458,573,686,796,909,1023,1129,1244	Mann, Albert, Engineering Co., Ltd.: Foundry equipment for Hungary	290
		Machine tool assembly shop at the Ordjonikidze plant	904	Mansill, Booth & Co., Ltd.: Batch production on Gnutti Rotacycle machines	1190
		Machine tool building in Russia	116,228,676,904	Marbaix, Gaston E., Ltd.	18,36
		Machine tool deliveries	1443	Marcar, Alexander & Co., Ltd.: Exhibits at London International Engineering and Marine Exhibition	923
		Machine tool demonstration. Elgar	1320	Marconi Co., Ltd.: Optical shaft and pneumatic shaft encoders	1197,1198
				Pneumatic tape reading unit	804
				Pneumatic tape reader and associated binary to decimal converter	1199
				Mark Century 100B n.c. system	139
				Mark Century 100M n.c. system	890

	PAGE		PAGE		PAGE
Mark Century 100S n.c. system for oxy-cutting machines . . . . .	131	Melting, Aluminium, in bulk . . . . .	517	Milling machine, Craven transportable, for operations on turbine rotors and castings . . . . .	719
Marking machine. The Pryor E.P. 20 electro-chemical . . . . .	626	Menn, E.W.: Type KS5 automatic screw head slotting machine . . . . .	951	Milling machine, Crossax Sturdimill type IV vertical . . . . .	851
Marking-out unit at Webster & Bennett. PDQ . . . . .	657	Mergenthaler Diagrammer . . . . .	1152	Milling machine, Elgamatic Milmor, with Airmec Autoset tape control . . . . .	1058
Marking unit, Letroetch portable . . . . .	1144	Merrick, R.C.: High-precision abrasive machining . . . . .	466	Milling machine, Elliott 70 series vertical, with A.E.I. tape control . . . . .	1057
Marriner, R.S.: Developments in hardness testing . . . . .	1409	Mesh, molybdenum. Use of, to exclude dross from non-ferrous castings . . . . .	311	Milling machine, Elliott Sturdimill vertical, of "cubed" construction . . . . .	1054
Marshall Conveyors, Ltd.: Bendveyor power-driven belt conveyor . . . . .	1272	Messer Griesheim, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	866	Milling machine, Elliott Sturdimill vertical, controlled vertical . . . . .	886
Marshall, John, (Engineers), Ltd.: Burrmaster machine for deburring bar material and tubing . . . . .	994	Statosec SK automatic multiple flame cutting machine . . . . .	1382	Milling machine, Hitachi 7060 n.c. 2-spindle . . . . .	812
Martonaire, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	856	See also . . . . .	1053	Milling machine, Hungarian type MFP 320 automatic cycle vertical . . . . .	44
Push button-operated stop valve . . . . .	1295	Messer Griesheim, Germany: Large Sicomat PA 14-3 flame-cutting machine . . . . .	1053	Milling machine, Hungarian type MHV-4-21 duplex . . . . .	41
Masks for manufacture of integrated circuits. Diagram showing set-up for demonstrating a method of producing . . . . .	1202	Metal stockholding centre. RTZ Metals . . . . .	1034	Milling machine, Hungarian type VF 222 semi-production . . . . .	44
Mastercount type 452 counting and batching equipment. Decca . . . . .	1164	Metals. New porous . . . . .	1329	Milling machine, P.Hiue 538 bed-type . . . . .	1060
Masters, Machining, made from plastics-filled honeycomb material . . . . .	1358	Metallurgical Services: Metaserv end quenching unit . . . . .	21	Milling machine, Huron numerically-controlled, Set-up on . . . . .	264
Matchless Machines, Ltd.: Demonstration of Newall-AGIE type 1520-75a jig erosion machine . . . . .	663,834	Metoma, Ltd.: Metric reading dial indicators. Baly inch and . . . . .	807,1300	Milling machine, Huron type MVP 50 vertical . . . . .	1060
See also . . . . .	1267	Metric/inch dial unit. Vickers . . . . .	32	Milling machine, Ingers V3 vertical . . . . .	666
Materials. Electrodeposited composite . . . . .	476	Metrology in the computer industry . . . . .	284	Milling machine, K. & G. vertical, with Plessey numerical control . . . . .	987
Materials Handling Exhibition. Scottish . . . . .	1272	MEY electro-magnetic forming machine . . . . .	417	Milling machine, Keamey & Trecker-C.V.A. special, with sequence-controlled work-handling equipment . . . . .	236
Mathieson, Olin, Ltd.: Equipment for boosting factory air line pressure . . . . .	742	Voronezh . . . . .	71	Milling machine, Molins 3-axis n.c. . . . .	1333
Isostatic pressing equipment . . . . .	66	Michigan Tool Co.: Process for rapidly forming spur gear teeth and splines . . . . .	549	Milling machine, New Cincinnati Toolmaster . . . . .	538
Laboratory isostatic powder compacting press . . . . .	1313	Micro-circuit jig. Feed-through collar and . . . . .	9	Milling machine, Philips numerically-controlled cam . . . . .	187
Matrix jig borer with diffraction grating and interferometric measuring systems . . . . .	38	Micro-machining. Laser . . . . .	1201	Milling machine, Programme and numerical control systems for Parkson Miller-Matic . . . . .	250
Max Arc, Ltd.: Type TR 2000 CO <sub>2</sub> welding torch . . . . .	927	MicroBlast process. The . . . . .	21	Milling machine, Rambaudi Ramcop-3D copy . . . . .	1320
Maxam Power, Ltd.: Maxalog fluid logic system for safety control . . . . .	124	Micromat automatic inspection equipment for pistons . . . . .	404	Milling machine, Schaffner type F 17M multi-programme production . . . . .	948
New turbulence amplifier for fluid logic control equipment . . . . .	40	Micrometric Hone Corp.: Machine for checking V-type cylinder blocks . . . . .	19	Milling machine, Schaffner type F 7M production . . . . .	246
Valve for pneumatic guard control for die casting machine . . . . .	1366	Micrometers. New Shardlow Anglometric . . . . .	147	Milling machine, Shizuoka vertical . . . . .	967
McDonald Aircraft Corp.: Machining masters made from plastics-filled honeycomb material . . . . .	1358	Microscope, measuring. Determining the radius of an arcuate surface with the aid of a . . . . .	520	Milling machine, Shizuoka type VHRU-G universal turret . . . . .	146
McLean Research Engineering Co., Ltd.: Activities of the company . . . . .	1193	Microscope. Zeiss P.I. universal measuring . . . . .	357	Milling machine, Sturdimill Omnimill . . . . .	1056
McNaught, D.: Electro-hydraulic pulsed control system . . . . .	829	Midland Electric Manufacturing Co., Ltd.: Aluminium bushing chambers . . . . .	1416	Milling machine, Thiel type 159 universal toolroom . . . . .	326
Open-loop velocity control for machine tool applications . . . . .	1155	Midland Machine Tool Co. (Birmingham), Ltd.: Abrasive-wheel cutting-off machine . . . . .	1262	Milling machine, Waltec bed-type production . . . . .	881
Measurement, distance, Application of lasers to . . . . .	1369	Midland-Ross Corp.: Roller burnishing bores in differential warning switch bodies . . . . .	1023	Milling machine, Weiler type FHP 600 production . . . . .	696
Measurement of involute gear teeth. Some practical aspects of the . . . . .	459,773,899	Midland Silicones, Ltd.: Release-A silicone release agent . . . . .	638	Milling machine, Werner type FV 2D programme-controlled vertical . . . . .	491
Measurement of line straightness . . . . .	591	Miehle-Goss-Dexter, Ltd.: Economies obtained with Cintimatic n.c. machines . . . . .	184	Milling machine, Werner type VF1.5 vertical . . . . .	491
Measurement of small dimensions. Laser equipment for diffraction . . . . .	1186	Mighty Midget 250D transportable diesel-engined welder. Hayter . . . . .	867	Milling machines. Hardress work-holding fixture for production . . . . .	1160
Measurement of surface quality. Optical . . . . .	1195	Mikromat Dresden. VEB: SWPO 80 n.c. polar co-ordinates profile grinder . . . . .	1085	Milling machines, Harrison - some aspects of their manufacture . . . . .	1353
Measuring equipment for Bridgeport machines. British-built optical . . . . .	797	Type BKO-E 315 by 500 jig borer with Zeiss optical system . . . . .	548	Milling machines, Pegard boring and . . . . .	18
Measuring equipment. Broomfield Park Square . . . . .	825	Mikron type 106-01 short-thread milling machine . . . . .	947	Milling machines, Polish, with Numeroblock n.c. equipment . . . . .	28
Measuring equipment. New J. & S. tool pre-setting and . . . . .	718	Mill-roll lathe. Large Forcip . . . . .	241	Milling machines, TOS Kurim types FC 63 and FC 63 V numerically controlled . . . . .	246
Measuring equipment. Position . . . . .	1196	Mills. semi-finishing, New 4-crank thear for . . . . .	1308	Milling machines, Try-Deta programme-controlled . . . . .	473
Measuring machine. Application of Ferranti drawing . . . . .	585,1399	Miller-Betabite, Ltd.: High-pressure tube couplings . . . . .	304	Milling, multiples of, of impellers on Bridgeport machines . . . . .	255
Measuring microscope. Determining the radius of an arcuate surface with the aid of a . . . . .	520	Miller Electric Manfg. Co.: Constant potential rectifier for fine-wire welding . . . . .	998	Milling titanium at high speed with rotating carbide inserts . . . . .	1351
Measuring microscope. Zeiss P.I. universal . . . . .	357	Miller-Matic milling machine. Programme and numerical control systems for . . . . .	250	Milling tool set. E.M.E./Nikken . . . . .	922
Measuring system. A fluidic absolute . . . . .	490	Parkson . . . . .	1321	Milom Hematite Ore & Iron Co., Ltd.: Spray steelmaking plant in operation . . . . .	137
Measuring system. Russian electro-optical . . . . .	230	Milling and boring machine. Boko WF 2 bed-type toolroom . . . . .	941	Milwaukee-Matic Series IIIB machining centre . . . . .	1107
Measuring system, interferometric, Matrix jig borer with diffraction grating and . . . . .	38	Milling cutter. Churchill close-pitch throw-away tip face . . . . .	235	Milwaukee-Matics. Clean room for assembly of British-built . . . . .	1309
Measuring table. British Aircraft Corp. precision roundness . . . . .	1200	Milling cutters. Profile 50-mm. Futurmill . . . . .	183	Mimik, Ltd.: Dynatrace hydraulic copying system on Churchill-Denham centre lathe . . . . .	993
Measuring the thickness of a moving strip. Solex Cee gauge for continuously . . . . .	1163	Milling cutters. Stora 3-System clamped-tip face . . . . .	1349	Determining the radius of an arcuate surface with the aid of a measuring microscope . . . . .	520
Mec-Test, Ltd.: Proximity sensor . . . . .	33	Milling, drilling and facing machine. New Richards horizontal boring . . . . .	321	Equipment for checking the concentricity of rotary tools . . . . .	93
Meddings, W.J., (Sales) Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	863	Milling fixtures. Purefoy . . . . .	1406	Mini Freewheel clutch. Stieber . . . . .	37
Machine for boring distributor caps . . . . .	149	Holroyd machine for . . . . .	296	Mini-16 automatic screw machine. Brown & Sharpe introduce . . . . .	1380
Machine for drilling holes in tubes . . . . .	1416	IE auto-cycle horizontal . . . . .	573	Miniature Precision Bearings, Inc.: Harmonic Drive Divn.: Power transmission system . . . . .	760
Machine for facing and centring crankshafts . . . . .	1098	Milling machine. Balding Mark II Beaver . . . . .	920	Miniline, Renault, transfer machine for operations on diesel engine cross-heads . . . . .	364,557
Multi-head machine for drilling channel-section parts . . . . .	1203	Milling machine, Beaver turret, equipped with Gettys electronic 3-dimensional copying system . . . . .	1374	Ministry of Technology: Production Engineering Advisory Service . . . . .	770
Meggett Machine Tools & Equipment, Ltd. . . . .	944	Milling machine. Cinedo type 207-14 universal . . . . .	1205	Some examples of the work of the work of the Industrial Liaison Centres . . . . .	375
Meier, G.: Vibratory deburring and finishing . . . . .	1139			Minnesota Mining & Manfg. Co., Ltd.: 3M Airflow and Coolair buffs and mops . . . . .	602

	PAGE
Minsk Automatic Machine Plant: Production of special-purpose and transfer machines . . . . .	564
Minsk Motor Works and Minsk Tractor Factory: Agricultural tractor production . . . . .	340
Diesel engine production . . . . .	345,452
Mitchell, D. & Co., Ltd.: Elliott Concord lathe . . . . .	1056
Mitchell, D.G.: Fluidic circuits used in a drilling sequence control system . . . . .	801
Model of proposed factory layout built up from Modulex components . . . . .	924
Model system, factory planning, Modulex . .	183
Modena screwless plugs and terminals . .	1045
Modena-Matic 220 n.c. drilling, milling and boring machines. Fiat . . . . .	24
Modernizing existing equipment with stock automation units . . . . .	488
Modulog system. Some industrial applications of the . . . . .	1136
Modular assembly technique for printed- circuit board units . . . . .	651
Modulux 3-Dimensional Planning, Ltd.: Factory planning model system . . . . .	924
Scale model of proposed factory layout built up from Modulex components . . . .	1333
Molins Machine Co., Ltd.: 3-axis n.c. milling machine . . . . .	311
Moly-Metal-Mesh used for exclusion of dross from non-ferrous castings . . . . .	942
Mondiale S.A.: Callicop automatic copying lathe . . . . .	650
Monitors. Panalarm Series 70 annunciators and . . . . .	465
Monitoring equipment. Dave vibration . .	407
Monk Bridge Iron & Steel Co.: Installation of Hasenclever 4000-ton hydraulic screw press . . . . .	407
Monometer Manufacturing Co., Ltd.: Lip-axis tilting reverberatory furnace for melting aluminium . . . . .	518
Moore Special Tool Co., Inc.: Precision rotary and indexing tables . . .	1101
Mortimer Machine Tool Co., Ltd. . . . .	472,537
Moscow type MB 13 B1 automatic tap relief grinder . . . . .	417
Moscow type 6060 bearing ring grinder . .	414
Moscow type CA-15 2-spindle bearing grinder . . . . .	413
Moscow type 2B 440 P n.c. jig borer . . .	77
Moscow type 5891 gear shaper cutter grinder . . . . .	317
Motor car door assembly line. The new Ford . . . . .	508
Motor car engine blocks. Machining cylinder bores in, with ceramic tools in com- pensating spindles . . . . .	1314
Motor car engine front cover. Transfer machine for operations on . . . . .	581
Motor car engine push rod production at the works of GKN Birmingham . . . . .	1130
Motor car suspension arm. Producing a die cast . . . . .	709
Motor car underbody. Viva, Hall multiple- weld transfer line for the . . . . .	599
Motor cycles. Advanced assembly techniques for BSA . . . . .	1038
Motor, Danfoss Orbit hydraulic, on plastics extrusion machine . . . . .	494
Motor lorry engine components. Production of Russian . . . . .	788
Motor. Slo-Syn type TS 50-1001 stepping .	1372
Motor speed control system. Borg-Warner Accuspede . . . . .	1097
Motor. Staffa Mark 16 10-cylinder hydraulically-biased . . . . .	856
Motors. Crompton-Dupar small brake . . .	1159
Motors. Die cast aluminium squirrel-cage rotors for electric . . . . .	722
Motors. IMC stepping . . . . .	762
Motors. New Slo-Syn . . . . .	764
Motors. Variable-speed, with thyristor control . . . . .	60
Moulding machine. Kuenkel Wagner fully- automatic . . . . .	1224
Moulding machine. Large Japanese plastics injection . . . . .	835
Moulding machines. Herbert plastics injection, at the works of Kodak Ltd. . . . .	593
Moulding process. New plastics . . . . .	983
Mountbank Engineering Co., Ltd. . . . .	541
Mowery, G.F.: Automatic flash removal from plastics parts	76
Murhead & Co., Ltd.: Linear transducer for measurement of slide positions on machine tools . . . . .	1196

Mullard Blackburn, Ltd.: Radio valve assembly mechanization . .	101
Multi-head machine for drilling channel- section parts. Meddings . . . . .	1203
Multi-operation n.c. machine H.P.E. Hi- Promatic . . . . .	16,1437
Multi-start hobbing of gears . . . . .	10
Multicoke Solders, Ltd.: Solder pellets . . . . .	1113
Murex Positioning Equipment Ltd.: Type 77/05 positioning unit for welding applications . . . . .	869
Murex Welding Processes, Ltd.: Exhibits at International Welding Exhibition	869
Myford, Ltd.: Type ML/TT 3½-in. centre lathe . . . . .	910

## N

National Cash Register Co.: High-precision abrasive machining . . .	466
National Engineering Laboratory: Cylindrical grinder with a number of oil hydraulic elements . . . . .	827
Developments in hydrostatic drive systems	291
Fluidic absolute measuring system . . . .	490
Report on computer-aided design . . . .	125
National Machinery Co.: National Kayser transfer equipment for forging presses . . . . .	1154
National Physical Laboratory: Correction factors for Vickers hardness tests . . . . .	773
Developments in hardness testing . . . .	1409
5-in. rule with inch and mm. edge scales repeated at the centre . . . . .	1195
Need to exploit research results. The Neill, James, & Co. (Sheffield) Ltd.: "Eclipse" Product Education Centre . . .	1168
Neville, J.C., Ltd. . . . .	698
New Conveyor Co., Ltd.: Exhibits at Scottish Materials Handling Exhibition . . . . .	1273
Newall, Alexander S., Machine Tool Co., Ltd.: Exhibits at London International Engineering and Marine Exhibition . . .	997
Newall Engineering Co., Ltd.: Newall-AGIE type 1520-75K jig erosion machine . . . . .	663,834
Type AHAC automatic crankshaft grinder . . . . .	1051
Unit-type grinder with automatic work handling equipment . . . . .	1419
Newall Group Sales, Ltd. . . . .	1051
Newman Hender (Woodchester), Ltd.: New premises for research division . . .	1330
Newman Industries, Ltd.: Activities of the Plant and Machinery Division . . . . .	359
Die cast aluminium squirrel-cage rotors for electric motors . . . . .	722
Newton Chambers Engineering, Ltd.: Order placed for Bronx large plate bending rolls . . . . .	249
Nibbling machines. Pels . . . . .	847
Nickel plating process. Enplate Ni-410 chemical . . . . .	1325
Nickols Automatics, Ltd.: Conversion of capstan lathes to automatic operation . . . . .	1401
Nikken, E.M.E., milling tool set . . . .	922
Niles DRT programme-controlled drum turret lathes . . . . .	1086
Nimike, Ltd. . . . .	1221
Non-destructive testing facilities. Westinghouse . . . . .	516
Normalair, Ltd.: Multiple-milling of impellers on Bridgeport machines . . . . .	255
North American Aviation Structural Machining Centre: Installation of large-capacity electro- chemical machines . . . . .	1417
North Bar Tool Co., Ltd.: Pneutorque equipment for torque testing joints . . . . .	27
Northrop-Norair Corp.: Milling titanium at high speed with rotating carbide inserts . . . . .	1351
Norton Abrasives, Ltd. . . . .	702,805,1189

Norton International, Inc.: New wheels for roll grinding . . . . .	702
Behr-Manning Divn.: Diamond abrasive belts . . . . .	40,1188
Flexi-Disc and fibre disc pad . . . . .	805
Numerical 311 continuous-path control on Schehr lathe . . . . .	1084
Numerical control. Contour machining by means of point-to-point . . . . .	637
Numerical control developments. Japanese Numerical control equipment, Applying, to existing machines . . . . .	524,1091
Numerical control equipment. Construction of Olivetti . . . . .	1136
Numerical control. Experimental unit for instruction in . . . . .	831
Numerical Control. Into the 1970's with, Conference on . . . . .	1276
Numerical control. Machines with: Cincinnati Cintimatic machines . . . .	184
Czechoslovak MAS type SPN 12 lathe . .	242
Dean, Smith & Grace lathes . . . . .	1001,1109
Elliott Elgamatic Milmor milling machine	1058
Elliott 70 series 318 vertical milling machine . . . . .	1057
Enlms 4532 wire spark erosion machine	193
Fiat Modena-Matic 220 drilling, milling and boring machine . . . . .	1045
Gate Omega No.2 jig borer . . . . .	267,885
Giddings & Lewis-Fraser Hybormill type 70a borer . . . . .	876
Gottwaldov type SKJ10 vertical turning and boring mill . . . . .	245
Gottwaldov types RPN 65 and SPK turret lathes . . . . .	243
Hancock Hancock and Han-co-line oxy- cutting machines . . . . .	131
High Production Equipment Hi-Promatic multi-operation machine . . . . .	1437
High Production Equipment Hi-Promatic multi-purpose machine . . . . .	16
Hitachi 7050 2-spindle milling machine	812
Hungarian heavy-duty radial drilling machine . . . . .	42
Huron type MU6 CNP milling machine	264
Kearney & Trecker Milwaukee-Matic Series IIB machining centre . . . . .	1107
Kearns 3-axis machining centre . . . . .	1326
Kendall & Gent vertical milling machine	987
Koping type ANC machining centre . . .	471
Magdeburg Mafumat DF 315 num. chucking lathe . . . . .	979
Makino MCP-70 horizontal boring machine	811
Mikromat SWPO 80 polar co-ordinates profile grinder . . . . .	1085
Molins 3-axis milling machine . . . . .	1333
Moscow type 2B 440 P jig borer . . . .	77
Parkinson Miller-Matic milling machine	250
Philips cam milling machine . . . . .	187
Polish milling machines . . . . .	28
Russian prototype borer . . . . .	229
Schehr DXWK 630 by 4000 roll-turning lathe . . . . .	1083
Schleifmaschinenwerk Karl Marx Stadt type SA 315 by 630 p cylindrical grinder	976
TOS-Kurim types FC 63H and 63V milling machines . . . . .	246
Toyo Kogyo camshaft grinder . . . . .	814
Toyo Kogyo T-4518 8-station turret drilling machine . . . . .	813
Vero Autodrill drilling machine . . . . .	145
Vero turret type drilling machine . . . .	22
Vero 15/24-1000 series turret machining centres . . . . .	162
Warner & Swasey chucking automatics .	85
Zerbst type DP 630 Num. facing lathe	547,982
Numerical control of machine tools. B.S.I. interim coding table for . . . . .	1114
Numerical control of machine tools. The application of fluids in the . . . . .	802
Numerical control and measuring system. Philips . . . . .	1327
Numerical control for oxy-cutting machines	131
Numerical control. Plessey, K. & G. vertical milling machine with . . . . .	987
Numerical control. Seminar on . . . . .	771
Numerical control system. Acramatic IV .	1036
Numerical control system. Airme Autosec N 410, applied to a Gate-Omega No.2 jig borer . . . . .	267,885
Numerical control system. Mark Century 100B . . . . .	139
Numerical control system. Mark Century 100M . . . . .	890
Numerical control system. Numeroblock .	28
Numerical control systems for Parkinson Miller-Matic milling machine. Programme and . . . . .	250
Numerical control without feedback . . .	47

Numerical control by operator	PAGE 731	Oxygen cutting machine installed at works of Macready's Metal Co.	PAGE 861	Photo-elastic stress analysis	PAGE 700
Numerical control. A system for production by	1396	Ozalid Co., Ltd.: Kuhlmann drafting machine	30	Photo-electric control unit. Detects	374
Numerically-controlled chucking automatics. Productivity and profits increased with	85			Photo-electric guarding system for press brakes. Udal	630
Numerically-controlled co-ordinate table. Hungarian heavy-duty radial drilling machine with Grimston-AEI	42			Physics Exhibition	1195
Numerically Controlled Machine Tool Centre. Airtec	951			Picard, Henri, & Frere, Ltd.	1268
Numerically-controlled machine tools - deliveries and orders	1170			Piercing punches. Drei-S-Werk square and rectangular	1438
Numerically Controlled Machine Tools, Ltd.	811			Piercing technique. A new tube	258
Numerically-controlled machines. Economies obtained with Cintimatic	184			Piercing units. Greenlee	1094
Numerically-controlled machines. "Universal" fixtures and auxiliary equipment for	1420			Piercing technique. A new tube	258
Numerically-controlled machining service. A sub-contract	820			Piercing units. Greenlee	1094
Numerically-controlled programming seminar. English Electric	606			Pilkington Perkin-Elmer, Ltd.	
Numeroblock numerical control system. Nu-Plant, Ltd.	28			Shop floor angle checking to 1 min. of arc	989
Exhibits at International Welding Exhibition	866			Pipe-line delivery system for workpieces. Kingfisher	699
Nut tapping unit. MacLean series 250 high-speed	480			Pipe threading machine. Fransson & Brantemo type RH	697
Nuts. I.F.A.C. blind captive	34			Pistol, F.J., Ltd.: Demonstration of Krupp automatic duplex slitting machine	1440
Nuts, T., for Adcock & Shipley machines. Bolts, clamps and	45			See also	1101
Nuts, loosening and tightening. Atlas Copco impact tool for	1405			Pistons. Micromatic automatic inspection equipment for	404
				Pitch tester. Zeiss mechanical fine, for use on spur and helical gears	548
				Planet Welding Equipment, Ltd.: Exhibits at International Welding Exhibition	871
				Planing equipment, Angle, for Boshinger planing machines	1252
				Planing machine. Cervi-Rockford type OS	492
				Planing machine. Large Strik open-side	1145
				Planning. Computer simulation to facilitate manufacturing	631
				Planning model system. Modulux factory	651
				Plano-milling machines. Sverdlow	121
				Plants for export. Complete	395
				"Plastic Carbide" abrasion-resistant material	1244
				Plastic Rotational Mouldings, Ltd.: New plastics moulding process	983
				Plastics coating. Femox DW 66 strippable	403
				Plastics components. Glass-fibre reinforced, produced by cold pressing	737
				Plastics-covered lightweight steel tubing	88
				Plastics-filled honeycomb material. Machining masters made from	1358
				Plastics injection moulding machines at the works of Kodak Ltd., Herbert	593
				Plastics injection moulding machines. Large Japanese	835
				Plastics moulding dies. Selective plating of cavities in	529
				Plastics moulding process. New	983
				Plastics parts. Automatic flash removal from	76
				Plate bending rolls to be built by Bronx Engineering Co., Large	249
				Plate flattening press. John Shaw	533
				Plate straightening machine	
				Blechbearbeitungsmaschinenwerk	995
				Plates. Explosive forming of large	378
				Plates. Large titanium	988
				Platens, Quick-change work, for the Vero Autodrive n.c. drilling machine	145
				Plating. Canning plant for barrel or rack	805
				Plating process. Enplate Ni-410 chemical nickel	1325
				Plating. Selective, of cavities in plastics moulding dies	529
				Plating. selective, Recovery of damaged cylinder blocks by	479
				Plessey Co., Ltd.: Fluid logic units	212
				Numerical control system for K & G vertical milling machine	987
				Plessey Communication Systems, Ltd.: Audio-visual system for instruction of production line workers	1194
				Plessey Professional Components Divn.: Dynamic torque tracer for testing Rotenoid solenoids	267
				Plugs and terminals. Modena screwless	183
				Plugboard on control unit of Accuratool 1-in. automatic capstan lathe	694
				Plugboard programming units. D.E.B.	765
				Plugboards. Controllox modular	763
				Pneumatic pneumatic valve. Hamilton	373
				Pneumatic guard control for die casting machine	1366
				pneumatic logic system. Aro	821
				Pneumatic spool valves. I.V.	761
				Pneumatic systems. Enots sintered bronze silencers for	484
				Pneumatic tape reading unit	804
				Pneumatic valve. Hamilton Pneumaid	373
				Pneumotone No. 8 unit for torque testing joints	27
				Pohls, Henry A.: True position tolerances for fasteners	1245
				Pointing small drills automatically. Machine for	1365



	PAGE		PAGE		PAGE
Pointing tubes. Wecker hydraulic press for	923	Press line at Ford Halewood works. New Dandy	960	Protection of machinery. Vibraswitch for	127
Poke Gun welding gun	926	Press Operations, Ltd.		Protector. Sudbury wet-metal	38
Polar co-ordinates profile grinder. Mikromat		Use of Dexion racks for press tool storage	634	Protolite, Ltd.	
SWPO 80 n.c.	1085	Press. Red Ring air-operated toggle	1163	Prolite 50-mm. Futurmil cutter	183
Poles, street lighting, of octagonal shape.		Press & Shear Machinery Co., Ltd.		Prowse, D.B.	
Promecam 100-ton hydraulic press brakes		Elgapress 40-ton inclinable power press	850	Measurement of line straightness	591
set up for production of tapered	1439	See also	1439	Proximity guard equipment. "Electronic"	23
Polish numerical control system	28	Press. squeeze, Payne Semblamatic hydro-		Proximity sensor. Mec-Test	33
Poljet wrist watches. Production of cases for	1236	pneumatic	1052	Proximity switches. Donovan Edytest	302
Pollard Ball & Roller Bearing Co., Ltd.		Press, Storm arbor, with percussion ram	818	Pyron, Edward, & Sons, Ltd.	996
Exhibits at London International Engineer-		Press tools. Gold Star unit	996	E.P. 70 electro-chemical marking machine	626
ing and Marine Exhibition.	862	Press tools. "Rapid Die" steel rule	521	Pugley, Joseph, & Sons, Ltd.	
Polystyrene. Patterns made from expanded	767	Press, 20-ton power, with safety guard	809	Machine tool exhibition	266
Polyurethane toothed belts. Synchroflex	263	Press. Weldall & Assembly 1000-ton cold		Pulley drives. Davall Powergrip	188
Pontoglio type TO 450 hydraulic copying		forming hydraulic	329	Pulleys. Crisscross permanent magnet	324
lathe	1265	Presses, BETEMA compacting, for metal		Pullmax type X-91 bevelling machine for plate	
Porous metals. New	1329	powder	588	edge preparation	853
"Portable" 10 transportable spot welding		Presses. blanking. Extended range of Fine-O-		Pump body. Die cast water	422
equipment. Landis Machine-Maiden	998	Matic fine	522	Pump components for an exhaust gas control	
Portable Welders, Ltd.		Presses. forging. Transfer equipment for	1154	system. Production of	542
Poke Gun welding gun	926	Presses. Krupp transfer	1100	Pump. Delta 1/2-h.p. coolant, for Vertomat	
Portage Machine Co.		Presses. Spherelease de-jamming arrangement	880	transfer machine	1435
PDQ marking-out unit installed at Webster		for power	533	Pump. Eckerle high-pressure gear	304
& Bennett	657	Presses. Waterbury Farrel PC transfer		Pumps. Dynex hydraulic	35
Position indicator. Clayton type 821 rotary	860	Pressed Steel Fisher, Ltd.		Punches. Drei-S-Werk square and rectangular	
Position-measuring equipment	1196	Installation of Claudgen conveyerized		piercing	1438
Position tolerances for fasteners. True	1245	infra-red oven	105,276	Punched-card programme control. Schwabische-	
Positioning table. Workmaster turret head		Installation of Cowlishaw Walker 600-ton		Huttenwerke type SHW-UF 3B horizontal	
machine with automatic	410	blanking press	1295	boring and milling machine with	1270
Positioning unit for welding applications.		Pressing. cold. Glass-fibre reinforced plastics		Purefoy Unit Tooling, Ltd.	
Murex type 77/05	869	components produced by	737	Recent additions to the range of unit	
Positioning unit. Tilt'R	1352	Pressing equipment. Isostatic	66	tooling	1406
Positioning the work table and cross slide on		Printed-circuit boards. Assembling	878	Purvis, R.D.	
a milling machine. OPL units for	921	Printed-circuit board units. A modular		Metrology in the computer industry	284
Powder compacting press. Laboratory isostatic	1313	assembly technique for	1136	Push-rod production at the works of GKN	
Powder. metal, BETEMA compacting presses		Printed-circuit logic assemblies. Trend	151	Birmingham	1130
for	588	Printed-circuit negatives produced by Ferranti			
Powell & Co.		drawing measuring machine	586		
Sprog electric scooter	983	Probe for testing hardness of gear teeth.			
Power Lifts, Ltd.		Branson	1106		
Fork-lift truck	320	Product Quality. Conference on Ensuring	574		
Power packs. Hy-Pro hydraulic	32	Production by numerical control. A system			
Power transmission system. "Harmonic Drive"	760	for	1396		
Power Vane compressors. "Consolidated		Production control. The Harwell computer			
for Pneumatic	1006	programme for	128		
Powergrip pulley drives. Davall	188	Production efficiency of centre lathes. Digitum			
Pratt, F. & Co., Ltd.		a system for improving the	1180		
Reorganization of works	1225	Production Engineering Advisory Service	770		
Pre-setting and measuring equipment. New		Production Engineering Research Association:			
J. & S. tool	718	Conference on Ensuring Product Quality	574		
Pre-setting equipment. Optimec optical tool	148	Production facilities. Improved research and,			
Precious-metal contacts. Some aspects of the		at Walker Crossweller	1401		
manufacture of	1344	Productivity and profits increased with n.c.			
Precision casting for abrasive machining.	1015	chucking automatics	85		
Precision Grinding, Ltd.		Profile grinder. Mikromat SEPO 80 n.c.			
Alexander 1:1 hand duplicator	694	polar co-ordinates	1085		
Preparation of n.c. tapes at Ferranti, Ltd.	1398	Programme and numerical control systems for			
Preparing tubes for welded Y-junctions	1324	Parkson Miller-Matic milling machine	250		
Press. Bliss 1000-ton coining, for brake shoes	95	Programme. Computer, for production control	128		
Press brake and guillotine shearing machine.		Programme control equipment, Geraide, and			
A proposed design for a combined	895	bar feed unit for capstan lathes	433		
Press brake. Barnes type HSC 56-ton hydraulic	545	Programme control. Flan equipment for	1304		
Press brake. Bronx 1000-ton hydraulic	532	lathes. Ether	189		
Press brake. Kingsland-AEL 150-ton hydraulic		Programme control. Machine tools with:			
down-stroking	916	Accuratool automatic capstan lathe	693,1383		
Press brake. Max Hartley type 210A hydraulic	920	Heckert milling machine	886		
Press brake. New Rushworth type PS.50		Herbert No. 0 capstan lathe	189		
upstroking hydraulic	1374	Niles DRT drum turret lathes	1086		
Press brakes. Elga Hydrapress hydraulic	262	Parkinson Parkson Miller-Matic milling			
Press brakes. Promecam 1000-ton capacity		machine	250		
hydraulic. Set-up on	1439	Schaffner type F 17M vertical milling			
Press brakes. Udal photo-electric guarding		machine	948		
system for	630	Schwabische-Huttenwerke type SHW-UF			
Press. Bronx 50-ton hydraulic	20	3B horizontal punched-card boring and			
Press. Cowlishaw Walker 600-ton blanking	1295	milling machine	1270		
Press. Cressex open-fronted inclinable power,		Shanks tube drilling machine	412		
equipped with Guy-Raymond dual feed unit	1375	Try-Deta milling machines	473		
Press. Czechoslovak type LE 160 eccentric,		Werner, Fritz, type FV 2D vertical milling			
with Aro fluid logic control equipment	1377	machine	491		
Press. Czechoslovak type LCE 160 eccentric	645	Programmed forging press installation. Towler			
Press. Elgapress 40-ton inclinable power	850	hydraulic equipment for	832		
Press feed unit. FCB ultra high-speed	535	Programming. Accuratool capstan lathe	1383		
Press. Fogg & Young, with SAAB Fluid Form		Programming. Design background and, of the			
attachment	1317	Dean Smith & Grace n.c. lathe	1109		
Press for pointing tubes. Wecker hydraulic	923	Programming equipment on industrial robots	179		
Press. forging. Equipment on ram to vary		Programming, n.c., seminar. English Electric	606		
the daylight on Czechoslovak LKM 630		Programming system. Automatic tube drilling			
crank-type	1379,1446	machine with simple	412		
Press. Forging. ZDAS type LVH 2500-ton		Programming units. D.E.B. plugboard	765		
screw-type	645	Projectina Co., Ltd.	470		
Press. Forsyth type VO50 hydraulic	297	Projection equipment. Line diagrams produced			
Press. Fresh type TP 630-20 die-spotting	1433	by automatic	1152		
Press. Geco type SP hydraulic straightening	148	Projector. EPO LP-10 optical	470		
Press. Hasenclever 4000-ton hydraulic screw	407	Projectors. Use of optical, for routine			
Press. John Shaw plate-flattening	533	inspection	563		
Press. Jones & Attwood Worcester 25-ton		Promecam 100-ton capacity hydraulic press			
ungeared power	847	brakes. Set-up on	1439		
Press. Large Berry die-spotting	94	Protech Advisory Services, Ltd.			
Press. Large isostatic, for the production of		Detects photo-electric control unit	374		
Ferro-Tic blanks	986				

## R

R.E.M. screw feed and assembly unit	1108
RIV-SKF Modulog system. Some industrial	
applications of the	488
RTZ Metals, Ltd.	
Stockholding centre at Elstree	1034
Rack plating. Canning plant for barrel or	805
Racks. Press tool storage, built up from	
Dexion Speedlock adjustable components	634
"Radial Lubricator". Tecalemit Mark 2	992
Radian relay delay unit. S.S.C.	762
Radiator elements. Special Russian machine	
for drilling and tapping	568
Radiatron automatic counting unit	239
Radio valve assembly mechanization	101
Radius of an arcuate surface. Determining	
the, with the aid of a measuring	
microscope	520
Radynne, Ltd.	
Machine for induction hardening of	
spindle-type parts	872
Railko, Ltd.	
Exhibits at London International Engineer-	
ing and Marine Exhibition	914
Ramanathan, S.	
The design of a pure fluid shaft encoder	803
Rambaudi Ramcop-3D copy milling machine	1320
Randall, James H., & Sons Ltd.	
Randalrak work assembly benches	1332
Rank Organization:	
Taylor Hobson Divn.	
Automatic high-speed inspection of variable-	
pitch cams for zoom lenses	1360
"Rapid Die" steel rule press tools	521
Rapid 2000 series hacksawing machine.	
Herbert	97
Ratiu, Mirela:	
Correction factors for Vickers hardness	
tests on curved surfaces	587,773

Raybrook Precision Honing Co., Ltd.: Type 350 honing machine . . . . .	825	Rolls-Royce, Ltd.: Economies obtained with Cintimate n.c. machines . . . . .	186	Safety equipment for drilling machines. Instabrake . . . . .	1350	
Read-out equipment applied to inspection . . . . .	477	Photo-elastic stress analysis . . . . .	700	Salem-Brosius (England), Ltd.: New heat treatment furnace for steel tubes . . . . .	1042	
Read-out systems facilitate production Reamer for correcting straightness errors . . . . .	1082	Roller burnishing bores in differential warn- ing switch bodies . . . . .	1023	Salford C.A.T. synchro-position transducer Sand castings and gravity die castings re- designed for pressure casting . . . . .	422	
Reamers and counterbores. Wyss. . . . .	1146	Roller Shear system for strip and plate processing lines . . . . .	865	Sand cores used for low pressure die casting Sand. zircon. Advantages of shell-mould casting with . . . . .	208	
Reaming, gun, Applications of, in valve production . . . . .	689	Rollers, feed, Improvement to working life of Rosemount Engineering Co., Ltd.: Fibre-optics mock-up for indicating tool point position . . . . .	1198	Sanding disc. Norton Flexi-Disc . . . . .	1302	
Rebuilding machine tools by Newman Industries . . . . .	359	Rosenbaum, H.M.: A pneumatic tape reading unit . . . . .	804	Sandvik (U.K.), Ltd.: Extension to works . . . . .	805	
Recorder Charts, Ltd.: Verigraph graph paper . . . . .	432	Rotacyle machines. Batch production on Gnutti . . . . .	1190	Turning tool for copying operations . . . . .	214	
Recovery of damaged cylinder blocks by selective plating . . . . .	479	Rotenoid solenoids. Dynamic torque tracer for testing . . . . .	267	Turning tool for copying operations . . . . .	215	
Rectifier for fine-wire welding. Miller constant potential . . . . .	998	Roth, Ing. Joachim: Production of pump components for an exhaust gas control system . . . . .	542	Santon, Ltd.: Rotary switch with motor-driven actuator Saratov type 3A 225 high-precision internal grinder . . . . .	915	
Red Head stud anchors. Phillips . . . . .	1408	Roto-Finish, Ltd.: Oxoblast wet blasting equipment . . . . .	469	"Salin" finishing technique . . . . .	313	
Red Ring air-operated toggle press . . . . .	1163	Oxonauf de-burring and finishing machine Vibratory de-burring and finishing . . . . .	945	Saunderson & Costin, Ltd.: Hardress work-holding fixture for production milling machines . . . . .	602	
Redcar Engineering Co., Ltd.: Centreless taper grinding . . . . .	1082	Rotor lamination plant. Erfurt stator and . . . . .	1139	Saw sharpening machine. Vollmer type CnK automatic . . . . .	1160	
Refining equipment. AEI-Burlec electro-slag Rerigering units. F. & R. coolant . . . . .	482	Rotors. Schenck fully-automatic balancing, correcting and grading machine for small Roumania Laboratory of Lead and Hardness: Correction factors for Vickers hardness tests on curved surfaces . . . . .	1089	Sawing machine. Bimax type TA.50 circular, with bar feed unit . . . . .	697	
Regina Foundry Co.: Small-capacity bandsawing machine . . . . .	1039	Roundness measuring table. British Aircraft Corpn. precision . . . . .	1157	Sawing machine. Keuro automatic circular . . . . .	97	
Reicherter, Georg: Briviskop hardness testing machines . . . . .	300	Rowland, F.E., & Co., Ltd.: Friction welding machine . . . . .	1200	Sawing machine. Large Cave-Cut type 12-50 friction . . . . .	698	
Relay delay unit. S.S.C. Radian . . . . .	807	Royal Ordnance Factory, Cardiff: Manufacture of beryllium . . . . .	864	Sawing machine. Peris 300 circular . . . . .	438	
Relay valve. Davis impulse . . . . .	762	Rubber components, machining hard. Use of diamond tools for . . . . .	1072	Sawing machine. Wessex billet . . . . .	995	
Release agent. Relestat-A silicone . . . . .	303	Rubber dies for wax patterns for small- quantity investment casting . . . . .	692	Sawing machines. Russian cold . . . . .	691	
Rem power tool equipment. Demonstration of . . . . .	638	Ruby Owen & Co., Ltd.: Installation of Weldall & Assembly 1000- ton cold forming hydraulic press . . . . .	635	Scaffolding props. Automatic welding machine for production of . . . . .	572	
Rembrandt Machine Tools, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	1435	Portable flash butt welder . . . . .	999	Scales. Trapezoidal-section glass . . . . .	1035	
Removal of swarf from machine tools . . . . .	853	Rugeberg, August: Pierd Plus reinforced abrasive discs . . . . .	1072	Scania, Ltd.: Panalarm Series 70 annunciators and monitors . . . . .	884	
Removing bearing inner rings. A simple tool for . . . . .	1343	Rule, NPL 5-in., with inch and mm. edge scales repeated at the centre . . . . .	692	Schaffner, E., AG: Type F 17M multi-programme production milling machine . . . . .	650	
Rennault Miniatur transfer machine for operation on diesel engine cross-heads . . . . .	364,557	Rushworth & Co., (Sowerby Bridge), Ltd.: New type PS.50 upstroking hydraulic press brake . . . . .	403	Schehr, VEB Maschinenfabrik John: DXWK 630 by 4000 n.c. roll-turning lathe Schenck, Carl: Fully-automatic balancing, correcting and grading machine for small rotors . . . . .	948	
Renold, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	854	Russia revisited 116,228,340,452,564,676,788,904 1016,1124,1236 . . . . .	1195	Schiesl gear shaper set up for cutting teeth in coupling ring of Allen-Stoeckicht epicyclic gear . . . . .	947	
Research and industry. The relations between, in Germany . . . . .	609	Russian automatic assembly machine for cylinder heads . . . . .	1374	Schleifmaschinenwerk Karl Marx Stadt type SA 315 by 630p n.c. cylindrical grinder Schloemann AG: New 4-crank shear for semi-finishing mills. Schmidt coupling which accommodates shaft offset . . . . .	1083	
Research and production facilities at Walker Crosweiler. Improved . . . . .	1401	Russian automatic assembly machine for piston/connecting rod units . . . . .	1374	School. Spenstead Group training . . . . .	1157	
Research results. The need to exploit Retallack, D.A.: Fluidic circuits used in a drilling sequence control system . . . . .	1395	Russian induction hardening machine for camshafts . . . . .	456	Schrader's, A. Son Divn., Scovill Manfg. Co.: Aluminium air cylinders . . . . .	946	
Retrofitting activities of General Electric Co. Reutlinger vertical balancing machines . . . . .	801	Russian link lines . . . . .	456	Schwabische Huttwerke G.m.b.H.: Type SHW-UF 3B horizontal boring and milling machine with punched-card programme control . . . . .	976	
"Revenue investment". The need for higher Rex leaf chains . . . . .	1091	Russian Machine Tool Exhibition 77,192,312,413 Russian orders exceeding £10 million . . . . .	1236	Sciaky Electric Welding Machines, Ltd.: Type CV2 electron beam welding machine with medium-vacuum work chamber . . . . .	1308	
Rhodes, Joseph, & Sons, Ltd.: Hydraulic shear . . . . .	1300	Russian steels. Classification of . . . . .	456	Scientific Systems, Ltd.: Special electronic control units for instruction in n.c. . . . .	372	
Richards, George, & Co., Ltd.: Machine tool demonstration week . . . . .	843	Rusted nuts and bolts. "Twist Off" for . . . . .	454	Scooter. Powell Sprog electric . . . . .	161	
New horizontal boring, milling, drilling and facing machine . . . . .	321	Ryder, Thomas, & Sons, Ltd.: Order from Leyland for 12 No.8 Verticalautos . . . . .	677	Scottish Machine Tool Corporation, Ltd.: Exhibits at London International Engineering and Marine Exhibition . . . . .	263	
Riveting machine. Hirst Electric Industries hot Roballo Engineering Co., Ltd.: Bearings for indexing and rotary tables . . . . .	1251	SADIE invoicing computer. Savings obtained with a . . . . .	1235,1279	Scottish Materials Handling Exhibition . . . . .	1272	
Roberts tube bending mandrel . . . . .	695	S.E.C.M.U. type CS 2000 milling machine SIF Gasmatic type 175 MIG welding equipment . . . . .	826	Screw feed and assembly unit. R.E.M. . . . .	1108	
Robertson, W.H.A., (Small Parts), Ltd.: Robertson-Hartford thread-rolling machine . . . . .	887	SIRA system for automatic inspection of blanks . . . . .	748	Screw head slotting machine. Menn type KSS automatic . . . . .	951	
Robot manipulator. GKN Unimate . . . . .	720	S-P Manufacturing Corp.: Circular gripping pieces for 3-jaw chucks . . . . .	300	Screw machine. Brown & Sharpe introduces the Mini-16 automatic . . . . .	1380	
Robots. Application of industrial . . . . .	179	Safety control. Maxalog fluid logic system for . . . . .	124	Screw thread standardization work in 1966 . . . . .	380	
Robotug. The E.M.I. . . . .	158			Screws. Heat treating 65 million, per week Screws. Method of sizing and deburring . . . . .	1161	
Rocker shaft components. Machining operations on . . . . .	752			Screwdriver blade hardening equipment . . . . .	437	
Rockwell Machine Tool Co., Ltd.: Hybormill seminars . . . . .	1277			Screwdriver for Avdel tool. Special Broom & Wade . . . . .	381	
Machine tool demonstration . . . . .	491			Screwdriver unit and bowl feeder. R.E.M. turbine . . . . .	1108	
See also . . . . .	326,1263			Scully International tool-changing and identification equipment 1 . . . . .	1328	
Rocol, Ltd.: D.F.S.M. dry-film lubricant . . . . .	458			Sealectro Corporation: Sealectboard programming equipment on AMF Versatran robots . . . . .	179	
Soluble oil for facilitating machining operations . . . . .	519,613			Seals, oil, hydro rotary shaft . . . . .	974,1116	
Rok-It Gauge Co.: Spherical bore gauge and Carb-O-Grip chuck jaw inserts . . . . .	248			Seam welder, British Federal d.c. . . . .	868	
Roll-burnishing machine. Cogsdill flat surface Roll-forging machine. Erfurt UWQ 40 by 400 transverse . . . . .	474			Seam welding tubing with Delapena in- duction hardening equipment . . . . .	864	
Roll-grinding. New Norton wheels for . . . . .	1087					
Roll, Karl, Apparatebau: Vapour degreasing unit . . . . .	702					
Roll-straightening machine at the works of Chesterfield Tube Co., Bronx . . . . .	1264					
Roll-turning lathe. Schehr DXWK 630 by 4000 n.c. . . . .	828					
Roll-turning lathe. Versa-Trace copying equip- ment on a Swift type 25DR . . . . .	1083					
Rolls, bending, Kumla PV5 initial-pinch . . . . .	1142					
Rolls, Large plate bending, to be built by Bronx Engineering Co. . . . .	848					
Rolls. Life of forming . . . . .	249					
	636					

	PAGE		PAGE		PAGE
Sections. Production of small precision parts from cold drawn . . . . .	620	Shot-blasting plant for machine tool castings	798	Speed control system. Borg-Warner Accuspeed motor . . . . .	1097
Security paint, New. . . . .	1129	Sicomat flame-cutting machine. Large Messer Griesheim. . . . .	1053	Speed detector unit. Quinton-Crane shaft . .	1371
Seddon Diesel Vehicles, Ltd.: . . . . .		Sigma Instrument Co., Ltd.: . . . . .	150	Speed reducer. Holroyd 2 5/8-in. centre Verso	371
Installation of Warner Swasey Aquith automatic with multi-spindle drilling heads . . . . .	1104	Type 31 EM inch-metric comparator . . . . .	484	Speedram cylinder. Bradbury . . . . .	31
Seletrons, Ltd.: . . . . .		Silencers for pneumatic systems. Enots sintered bronze . . . . .	638	Speedspray electrostatic paint spraying equipment. Volstatic . . . . .	21
Equipment for anodizing and selective treatment of metal surfaces . . . . .	408	Silicone release agent. Release-A . . . . .	43	Speedwell Gear Case Co., Ltd.: . . . . .	
Selective plating equipment for recovery of damaged cylinder blocks . . . . .	479	Simpson, Dr. A.W.: . . . . .	95	Installation of Fogg & Young press equipped with SAAB Fluid Form attachment . . . . .	1317
Selective plating process for cavities in plastics moulding dies . . . . .	529	Magnetic display panel . . . . .	43	Spencer & Halstead, Ltd.: . . . . .	
Selffeed feed cylinders incorporated in "Westwind Turbines" drilling units . . . . .	91	Pressure die casting methods . . . . .	96	Spentstead bench-type dust collector unit	470
Selfdrill air-operated drilling and tapping units. Brookman. . . . .	862	Sintered bronze silencers for pneumatic systems. Enots . . . . .	484	Spentstead shot-blasting plant for machine tool castings . . . . .	798
Semiblastic hydro-pneumatic squeeze press. Payne . . . . .	1052	Sintered part replaces 4-piece assembly . . . . .	759	View in new apprentice training school	161
Sensor. Mec-Test proximity . . . . .	33	Sintering of iron powder. Tin as an aid to the Sizing and deburring set screws. Method of Szeffko Ball Bearing Co., Ltd.: . . . . .	1161	Sperry Rand Corp., U.S.A.: . . . . .	
Separating investment castings from moulds and runners. Vibratory equipment for . . . . .	1020	Design of 3-bearing spindles for machine tools . . . . .	368	Univac fluid logic computer . . . . .	800
Sequence-controlled work-handling equipment. Kearney & Trecker-C.V.A. special milling machine with . . . . .	236	Simple tool for removing bearing inner rings . . . . .	405	Sperry Rand, Ltd.: . . . . .	
Service lift table. Hunter . . . . .	1274	Skiving process for cutting internal gears. Stachely . . . . .	12	Sperry Gyroscope Div.: . . . . .	
Services Electronic Research Laboratory: Helium-neon laser incorporated in set-up for producing masks for the manufacture of integrated circuits . . . . .	1202	Slide selector switch. Cherry crossbar . . . . .	541	Electro-hydraulic pulsed control system	829
Set-up on a numerically-controlled Huron milling machine . . . . .	264	Slideway grinding. Litton's increased capacity for . . . . .	306	Open-loop velocity control for machine tool applications. . . . .	1155
Sewern Lighting, Ltd.: . . . . .		Slitting machine demonstration. Krupp . . . . .	1440	Sphere-release de-jamming arrangement for power presses . . . . .	880
Dazor type M 209 floating magnifier . . . . .	1316	Slo-Syn automatic duplex . . . . .	764	Spindles, Design of 3-bearing, for machine tools . . . . .	368
Sewing machine components. Pressure die casting of . . . . .	936	Slo-Syn n.c. equipment, Application of, to existing machines . . . . .	527	Spinning lathe. Leifeld type Pib 1800 . . . . .	1048
Sewing machine production. Russian methods of . . . . .	1016,1124	Slo-Syn type TS 50-1001 stepping motor . . . . .	1372	Spiral Development Co.: . . . . .	
Shaft hardening machine. Delapena twin horizontal automatic . . . . .	535	Slotting machine. Menn type KS5 automatic screw head . . . . .	951	Plastics-covered lightweight steel tubing. . . . .	88
Shaft speed detector unit. Quinton-Crane . . . . .	1371	Slough Metals, Ltd.: . . . . .	202	Spiro Engineering, Ltd.: . . . . .	
Shanks & Co., Ltd.: . . . . .		Developments in low pressure die casting . . . . .	325	Heavy-duty bearings . . . . .	302
Automatic tube drilling machine with simple programming system . . . . .	412	Smart & Brown (Machine Tools), Ltd.: . . . . .	645	Spline-Line machine for rapidly forming spur gear teeth and splines . . . . .	71
Shape-correction by explosive forming . . . . .	379	Smart & Brown-Aldridge contour cutter grinder set up for sharpening a form . . . . .	325	Splines, involute, in Dex multi-spindle head	769
Shaping machines. Butler "general-service". . . . .	1263	Smeralovy type LCE 160 eccentric press . . . . .	643	Spool valve. Desoutter Lang solenoid . . . . .	303
Shaping spur gears. Optimum infed rates in Shardlow Micrometers, Ltd.: . . . . .	1404	Smeralovy type LKL 400 horizontal forging machine . . . . .	643	Spray Steelmaking, Ltd.: . . . . .	
New Anglometric micrometers . . . . .	147	Smeralovy type THP 18 washer-forming machine . . . . .	642	Company formed to exploit spray steel-making . . . . .	1059
Sharpening a form milling cutter. Smart & Brown-Aldridge contour cutter grinder set up for . . . . .	325	Smith, Dr. J.D.: . . . . .	1404	Spray steelmaking - a development of great potentialities . . . . .	1071
Shaw, John, & Sons (Salford) Ltd.: . . . . .	533	Optimum infed rates in shaping spur gears	1404	Spray steelmaking plant in operation at Milom . . . . .	137
Plate flattening press . . . . .	1308	Smith, Thomas, & Sons (Rodley) Ltd.: . . . . .	1382	Spraying equipment. electrostatic paint, Volstatic Speedspray . . . . .	21
Shear for semi-finishing mills. New 4-crank shear. Rhodes Hydralversal hydraulic . . . . .	297	Installation of Statosec SK automatic multiple flame cutting machine . . . . .	1382	Spraying equipment. lubricant, Clark's precision . . . . .	17
Shears. Cincinnati contact-operated . . . . .	135	Smiths Industries, Ltd.: . . . . .	154	Spraying machine. Automatic paint, for small parts . . . . .	406
Shears. Control system for modern flying . . . . .	743	Components and product design for automatic assembling . . . . .	154	Spring coiling machines. Torrington auxiliary feed mechanism for . . . . .	141
Shearing machine. Aireworth 200-ton hot and cold bar . . . . .	846	Soag Machine Tools, Ltd.: . . . . .	771	Sprog electric scooter. Powell . . . . .	943
Shearing machine. Besco Trucut guillotine shearing machine. B.R.G. French-built type 3000 A guillotine . . . . .	852	See also . . . . .	522,1085,1191	Sprue and runner design. Die casting die . . . . .	1825
Shearing machine. Kcetona 1/2-in. Hydro-Cut guillotine . . . . .	913	Societe Generale, Ltd.: . . . . .	47	Spur reduction gearboxes and power take-off units for tractors. Production of . . . . .	1288
Shearing machine. Proposed design for a combined press brake and guillotine . . . . .	595	Numerical control without feed-back . . . . .	47	Stacatrac, Ltd.: . . . . .	
Shearing machine. Ste-Co hydraulic guillotine shearing operations. Application of a Petro-Forge machine to high-speed . . . . .	919	Societe de Recherche & d'Application des Techniques de Productivite: . . . . .	915	Exhibits at Scottish Materials Handling Exhibition . . . . .	1274
Sheet Metal Machinery Co., Ltd.: . . . . .	274	B.R.G. type 3000 A guillotine shearing machine . . . . .	915	Stage, Leonard, Ltd.: . . . . .	
Elga Hydrapress hydraulic press brakes . . . . .	262	Sogenique (Service), Ltd.: . . . . .	37	Installation of Jagenburg coating plant . .	1386
Exhibits at London International Engineering and Marine Exhibition . . . . .	848	Equipment for automatic high-speed inspection of variable-pitch cams for zoom lenses . . . . .	1360	Stachely skiving process for cutting internal gears . . . . .	12
Sheet slitting line. Crompton Parkinson drive for a . . . . .	143	Solberga type SE75 drilling machine . . . . .	473	Staffa 10-cylinder hydrostatically-balanced hydraulic motor . . . . .	855
Sheffield Smelting Co., Ltd.: . . . . .		Solder, Drawn, collar preforms . . . . .	66	Stal, H.P.: . . . . .	
Some aspects of the manufacture of precious-metal contacts . . . . .	1344	Solder pellets. Multicore . . . . .	1113	The application of fluidics in the numerical control of machine tools . . . . .	802
Shell-Mex & B.P., Ltd.: . . . . .		Solenoid-operated hydraulic valve. Vickers-Detroit miniature . . . . .	303	Standard parts for jigs and fixtures. W.D.S. . . . .	401
Film: The lubrication of rolling bearings . . . . .	552	Solenoid valve. Bellows Valvair 3-way . . . . .	1352	Standard Telephones & Cables, Ltd.: . . . . .	
Shell-moulding casting with zircon sand. Advantages of . . . . .	1302	Solenoid valve. Devrance Asco miniature . . . . .	34	Diagram of set-up for producing masks for manufacture of integrated circuits . .	1202
Shell-moulding machines. British-built Croning Shelves. Dexion steel . . . . .	655	Solex (Gauges), Ltd.: . . . . .	1163	Standards information for machine tools . . . . .	67
Sherpa 50/54 lifting table . . . . .	1357	Cee gauge for continuously measuring the thickness of a moving strip . . . . .	1163	Standardized units for lathe construction . .	349
Sherpa fork-lift truck for handling press tools . . . . .	1379	Solid State Controls, Ltd.: . . . . .	762	Stanford University: . . . . .	
Shift-working - its importance and its problems . . . . .	1123	Radian relay delay unit . . . . .	762	Disc-loaded wave-guide built up from copper sections . . . . .	84
Shipham & Co., Ltd.: . . . . .		Sopame lifting equipment . . . . .	1224	Stankokonstruktia type 4b 772 combined ultrasonic and electrolytic die-sinking machine . . . . .	195
Modernization of foundry . . . . .	1224	Southern Instruments, Ltd.: . . . . .	859	Stanleys (Stratford), Ltd.: . . . . .	1005
Shipston Engineering Co., Ltd.: . . . . .		Miniature proximity vibration transducers . . . . .	859	Stannatic Precision, Ltd.: . . . . .	
Oil-Fog lubricator and compressed air filtering unit . . . . .	857	Spandau-Lindner: . . . . .	1270	Exhibits at London International Engineering and Marine Exhibition . . . . .	921
Shizuoka Machine Tools, Ltd.: . . . . .		SJP 35 bore and face grinding machine . . . . .	1270	Starcore gun reamers, Use of, in valve production . . . . .	690
Type VRHU-G universal turret milling machine . . . . .	146	Spark-erosion die-sinking machine. Russian type 4723 . . . . .	197	Starter. B. & R. Relays type KU12/S . . . . .	373
Vertical milling machine . . . . .	266	Spark-erosion machine. Agemaspark type F 400 . . . . .	883	Starter rings. Liebherr automatic hobbing installation for . . . . .	238
Shock treatment for high-speed steel . . . . .	481	Spark-erosion machine. Russian type 4531 . . . . .	192	Startrite Engineering (Sales), Ltd.: . . . . .	147
		Spark-erosion machine. Russian type MA 4729 type mould . . . . .	201	Multi-head drilling machine . . . . .	1089
		Spark-erosion machine with numerical control. Russian type 4532 wire . . . . .	193	Stator and rotor lamination plant. Erfurt . . . . .	1382
		Special-purpose drilling machine. Trojan automatic . . . . .	1281	Statosec SK automatic multiple flame cutting machine . . . . .	324
		Special-purpose and transfer machines. Equipment and methods used at Minsk Automatic Machine Plant for production of . . . . .	564	Staveley Aquith, Ltd.: . . . . .	912
				Stec-Co Products, Ltd.: . . . . .	
				Hydraulic guillotine shearing machine . .	918
				Steam cleaner. Wedgo portable . . . . .	1364
				Stedall Machine Tool Co., Ltd.: . . . . .	944

	PAGE
Steel. A new welding technique for light gauge .....	1403
Steel. EWC acid-resisting .....	1434
Steel. Peck & Tozer, Ltd.: Installation of Swift 25DR roll-turning lathe with Versa-Trace copying equipment .....	1142
Steel rule press tools. "Rapid Die" .....	521
Steel. Shock treatment for high-speed .....	481
Steel strip. Copper-coated .....	295
Steels. Classification of Russian .....	687
Steelmaking plant, Spray, in operation at Millom .....	137
Steelmaking, Spray: a development of great potentialities .....	1071
Steelmaking, spray, Company formed to exploit .....	1059
Steelworks. Highly mechanized inspection and de-seaming lines in a .....	758
Steering gear housings. Transfer machine with hydrostatic bearings for machining operations on .....	984
Steinel rotary transfer machine for drilling and tapping hub components .....	688
Stewarts & Lloyds, Ltd.: Installation of Havart billet cutting-off and die splitting bandsawing machine ..	806
Stieber (Gt. Britain), Ltd.: Mini free-wheel clutch .....	37
Stillage truck. Collis hand-controlled .....	553
Stirk, John, & Sons, Ltd.: Large open-side planer .....	1145
Stock automation units. Modernizing existing equipment with .....	34
Stock-holding centre, RTZ Metals, at Elstree .....	1034
Stoddard, T.A., C.Eng., M.I.Prod.E.: Multi-start hobbing of gears .....	10
Stone Machinery Inc., U.S.A.: Stop Slip belt dressing .....	913
Stora Steel, Ltd.: 3-System clamped-tip face milling cutters .....	1364
Storage racks. Press tool, built up from Dexion Speedlock adjustable components .....	1349
Storm arbor press with percussion ram .....	634
Stoving oven. "Automatic Equipment" .....	818
Straightening machine at the works of Chesterfield Tube Co., Bronx .....	210
Straightening machine, plate .....	828
Blechbearbeitungsmaschinenwerk .....	995
Straightening press. Geco type SP hydraulic .....	148
Straightness errors. Reamer for correcting .....	1082
Straightness. Measurement of line .....	591
Street, P.A.: Proposed design for a combined press brake and guillotine shearing machine ..	595
Stress analysis. Photo-elastic .....	700
Stretch forming. Some possibilities of radial Stretch-wrap forming machine built by Travers Metal Products .....	1296
Strip and plate processing lines. Roller Shear system for .....	865
Strip straighteners. Atkin combined coil cradles and .....	299
Stud anchors. Phillips expanding .....	1408
Stud welding equipment. Cycatron Mark 2 capacitor-discharge .....	872
Stud welding machine. KSM Autoweld are .....	929
Sturdimill. Elliott, vertical milling machine ..	952,1054
Sturdimill Omnium milling machine .....	1056
Sudbury wet-metal protector .....	38
Suffolk Iron Foundry (1920), Ltd.: SIF Gasmatic type 175 MIG welding equipment .....	926
Sully, Dr. A.H., O.B.E., M.Sc., Ph.D.: Progress in the production of large forgings ..	1207
Sump cleaner. A versatile machine tool .....	656
Super Oil Seals & Gaskets, Ltd.: Bydro rotary shaft oil seals .....	974,1116
Super-Sprite semi-automatic CO <sub>2</sub> welding unit. Lincoln .....	928
Superfinishing machine. Russian-built bearing track .....	318
Superior Electric Co., U.S.A.: Sio-Syn a.c. system .....	527
Sio-Syn type TS 50-1001 stepping motor ..	1372
See also .....	765
Superior Electric Netherlands, N.V.: New Sio-Syn motors .....	764
"SuperVisor" audio-visual system for instruction of production line workers ..	1194
Support pad arrangement for boring tools. Improved .....	523
Supports. Adjustable work, for engine assembly ..	455
Surface quality. Optical measurement of .....	1195
Surfaces. metal. Selections equipment for anodizing and selective treatment of ..	408
Suspension arm. Producing a die cast, for Ford ..	709
Svenska Aeroplan Aktiebolaget: SAAB Fluid Form attachment on Fogg & Young press .....	1317

	PAGE
Sverdlov works Leningrad. Activities of the ..	116,228
Swaging heads. "McLean Research" .....	1193
Swift, Removal of, from machine tools .....	1343
Swift type 25DR roll-turning lathe. Versa-Trace copying equipment on a .....	1142
Swiss Association of Machinery Manufacturers: Joint statement with M.T.T.A. .....	1114
Switch, Santon rotary, with motor-driven actuator .....	916
Switches. Donovan Edytect proximity .....	302
Switches. Honeywell CMC 4-way rotary, and push buttons on control panel of Vero grinding machine .....	540
Switches. Cherry crossbar slide selector .....	541
Switching. Honeywell KB modular keyboard system of display .....	541
Switching unit. Brookhirst Igranite limit. ..	531
Sykes Machine Tool Co., Ltd. ....	1253
Sykes, W.E., Ltd.: Gear generators for production of annulus gear components .....	439
Synchro-Matic presses. Danly .....	962
Synchroflex polyurethane toothed belts .....	263
Syndicat International du Decolage conference .....	1224
Systemation, Ltd.: SADIE invoicing computer .....	1206,1332

## T

TNO Institute for Mechanical Constructions, Delft: Applications of fluidics in the numerical control of machine tools .....	802
Design, characteristics and production of turbulence amplifiers .....	487
TOS-Celakovice type OS 12 gear shaving machines .....	640
TOS-Kurim type WIS 63 multi-spindle fine borer .....	640
TOS-Kurim types FC 63 and FC 63 V numerically-controlled milling machines ..	246
TR circuit board holder .....	490
Table. Enots rotary indexing .....	151
Table. Russian type KCV-53 co-ordinate ..	79
Table. service lift, Hunter .....	1274
Table. Sherpa 50/54 lifting .....	1357
Table. Taylor compound work .....	1223
Table unit for Grinston drilling heads .....	1044
Tables. Driss indexing and dividing .....	605
Tables. Moore precision rotary and indexing Takdust Products, Ltd. ....	1101
Takgard PC/747 peelable coating .....	652
Take-off units for tractors. Production of spur reduction gearboxes and power .....	1288
Tangent, Baue, method of measuring gear teeth .....	462
Tangram machine tool units .....	349
Tangyes, Ltd.: 160-ton chain testing machine .....	358
See also .....	400,1325
Tap relief grinding machine. Russian MB 13 B1 automatic .....	417
Tape control. Machines with (see Numerical control, machines with) .....	
Tape reader, Marconi pneumatic, and associated binary to decimal converter .....	1199
Tape reading unit. A pneumatic .....	804
Tapes. Preparation of n.c., at Ferranti Ltd. ..	1398
Taper grinding. Centreless, at the works of Redcar Engineering Co. ....	1082
Taper turning. Churchill-Denham lathe arranged for, with combined feeds .....	1043
Tapping brass collars. Broomatic machine for drilling and .....	950
Tapping compound. Adiformax E.P. ....	260
Tapping machine. Cressex hand .....	1266
Tapping unit. MacLean series 250 high-speed nut .....	480
Taylor Gear & Engineering, Ltd.: Compound work table .....	1223
Taylor Hobson Divn., Rank Organisation: Automatic cam inspection machine .....	1361
Automatic high-speed inspection of variable-pitch cams for zoom lenses ..	1360
Teamwork. Design by .....	1287
Tebco indexing fixture and drilling attachment ..	475
Tebrex, Ltd.: Triclamp tube clamps .....	186
Tecalmit (Engineering), Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	992
Techna (Gt. Britain), Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	995
See also .....	797,1046
Techna (Sales), Ltd.: Modena screwless plugs and terminals ..	183
Techna (Cambridge), Ltd.: Technolog fluid logic experimental kit ..	1059
Technical Representation, Ltd.: Circuit board holder .....	490
Telemechanics, Ltd.: Electronic thermometer .....	33
Television tube screens. Hungarian milling machine for operations on cavities in moulds for .....	29
Tellus Super Vacuum Cleaner, Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	913
Tensile testing machine. Denison-Mayes 20-ton electronic high-temperature .....	911
Test bars. alignment, Design of .....	1061,1278
Test rig. David Brown gearbox .....	796
Tests, hardness, on curved surfaces. Correction factors for Vickers .....	587,73
Testing equipment. Zeiss mechanical line pitch, for use on spur and helical gears .....	548
Testing facilities. Westinghouse non-destructive ..	516
Testing, hardness, Developments in .....	1409
Testing hardness of gear teeth. Brannon probe for .....	1106
Testing instruments. Zeiss gear .....	358
Testing joints. Equipment for torque .....	27
Testing machine. Denison-Mayes 20-ton electronic high-temperature tensile .....	911
Testing machine. Fogg & Young chain .....	1253
Testing machine. hardness, Dawe type 1851 ultrasonic .....	95
Testing machine. Tangeys 160-ton chain .....	358
Testing Rotenoid solenoids. Dynamic torque tracer for .....	267
Texas Instruments, U.S.A.: Integrated circuits employed for Cincinnati Acromatic n.c. systems .....	1036
Texas Instruments, Ltd. ....	765,1036
Textron's Bell Aerosystems Co.: Copy-machining operations on a complex thin-walled component .....	132
Than, Khin: Computer simulation to facilitate manufacturing planning .....	631
Thermactor exhaust gas purification system. Production of pump components for the Ford .....	542
Thermistor control system. Brookhirst Igranite ..	421
Thermometer. Rotothem 4-in. dial bi-metal ..	917
Thermometer. Telemechanics electronic .....	33
Thickness of a moving strip. Solex Cee gauge for continuously measuring the ..	1163
Thiel, Gebr., type 159 universal toolroom miller .....	326
Thin-walled component. Copy-machining operations on a complex .....	132
Thomas, J.J.: A simple vacuum chuck .....	1000
Thread milling machine. Mikron type 106-01 short .....	947
Thread rolling machine. Robertson-Hartford ..	887
Thread whirling attachment. Burgsmuller type HW-1 internal .....	149
Threading machine. Fransson & Brantemo type RH .....	697
Three-dimensional copying equipment. Gettys electronic .....	1374
Three-dimensional inspection machine. Ferranti 3M Airflow and Coolair buffs and mops ..	602
3-System clamped-tip face milling cutters. Stora .....	1349
Throw-away tip face milling cutter. Churchill close-pitch .....	941
Throw-away tip turning tools. Herbert-BSA ..	550
Throw-away tips. Valenite range of cutters and tooling incorporating .....	1377
Thyristor control. Variable-speed motors with ..	60
Tiki Engineering Co., Ltd.: Gear deburring machine .....	596
Tilt'R positioning unit .....	1352
Timer for welding applications. British Federal ..	380
Timing unit. "Magnetic Devices" .....	105
Timing units with "cuttable" cams .....	1373
Tin as an aid to the sintering of iron powder ..	1165
Titanium, Milling, at high speed with rotating carbide inserts .....	1351
Titanium plates. Large .....	988
Tolerance zones. Indication of, on optical projector charts .....	577
Tolerances. True position, for fasteners .....	1245
Tomkins-Johnson Co.: Air and hydraulic cylinders with built-in limit switches .....	36
Tool changing. Russian automatic .....	231
Tool-changing and identification equipment. Scully International .....	1328
Tool changing arrangements for heavy presses ..	961
Tool for loosening and tightening nuts. Impact ..	1405



	PAGE
Tool for removing bearing inner rings. A simple .....	405
Tool point position measurement. Possible method of .....	1198
Tool pre-setting equipment. Optimec optical tool pre-setting and measuring equipment. New J. & S. ....	718
Tool set. E.M.E./Nikken milling .....	922
Tool trolley. Enox No. 50 .....	686
Tool, turning, for copying operations. Sandvik Tools, ceramic. Boring with, in compensating spindles .....	215
Tools for Bending, Inc.: .....	1314
Roberts tube bending mandrel .....	695
Tools for high energy rate forging .....	1148
Tools. Herbert-BSA clamped-tip .....	550
Tools. Rem power. Demonstration of .....	1435
Tools. rotary. Equipment for checking the concentricity of .....	93
Toolset .....	1146
Toolholder. New Uddex clamped-tip .....	1368
Tooling system. Valente Var-Set .....	1377
Tooling unit. Recent additions to the Purcof range of .....	1406
Tooling. Wickman Wimet Econolock clamped-tip .....	1062
Tooling. Wimet Formlock .....	1080
Toolmaster milling machine. New Cincinnati Tool testing tips. Equipment for .....	538
Torque tracer, Dynamic, for testing Rotenoid solenoids .....	27
Torrington Manufacturing Co.: .....	267
Auxiliary feed mechanism for spring coiling machines .....	141
Toshiba Machine Co., Ltd.: .....	817
HBG-50A spiral bevel gear grinder .....	817
Towler Hydraulics, Ltd.: .....	832
Hydraulic equipment for programmed forging press installation .....	1371
Toyo Kogyo Co., Ltd.: .....	814
Type T-2365 n.c. camshaft grinder .....	814
T-4518 8-station n.c. turret drill .....	813
Tracer control. Advantages of contour turning under .....	817,898
Tracer, Dynamic torque, for testing Rotenoid solenoids .....	267
Tracer head, True-Trace, incorporated in Rambaudi Ramcop-3D copy milling machine .....	1320
Tractors and diesel engines. Russian methods for production of .....	340
Tractors. Machining operations on rocker shaft components for steering units on .....	752
Tractors. Production of spur reduction gear-boxes and power take-off units for .....	1288
Trainex 66 exhibition .....	103
Training. An advisory service for industrial training. Capital grant for operator .....	1261
Training centre. Apprentice, at the works of Ashdown Bros. ....	722
Training group. FSI industrial .....	608
Training instructors for industry. The importance of .....	103
Training school. Spenshead Group .....	619
Transam (Coventry), Ltd.: .....	161
Twin-linked assembly aid machines .....	73
Transducer for measurement of slide positions on machine tools. Linear .....	1196
Transducer. Hi-Syn synchro-position .....	1197
Transducers. Boulton Paul linear .....	301
Transducers. Southern Instruments miniature proximity vibration .....	860
Transfer equipment for forging presses .....	1154
Transfer line for the production of pump components for an exhaust gas control system. Buhr .....	542
Transfer line. Hall multiple-weld, for the Viva underbody .....	599
Transfer machine for connecting rods. Russian .....	453
Transfer machine for drilling and tapping hub components. Steinel rotary .....	688
Transfer machine. New centre column, Vaughan-Renault .....	268
Transfer machine for operations on fragile die castings .....	581
Transfer machine. Ordjonikidze .....	905
Transfer machine performance improved with hydrostatic bearings .....	984
Transfer machine, Renault Miniline, for operations on diesel engine cross-heads .....	364,557
Transfer machine. Russian fault indicator for .....	906
Transfer machine. The Transque centre-column .....	268
Transfer machine. The Vitlot centre-column .....	307
Transfer machine. Vertomat rotary, Demonstration of the .....	1435
Transfer machine. Vertomat rotary-indexing .....	1162

	PAGE
Transfer machines. Equipment and methods employed at Minsk Automatic Machine Plant for production of special-purpose and .....	564
Transfer machines, In-line, for wrist-watch cases .....	1236
Transfer presses. Krupp .....	1100
Transfer presses. Waterbury Farrel PC .....	533
Transfer system. Versatran robot .....	180
Transmission Developments Co.: .....	263
Synchroflex polyurethane toothed belts .....	759
Transmission gear quadrant. Sintered .....	760
Transmission, power, system. "Harmonic Drive" .....	98
Transportable billet drilling machine. Craven .....	719
Transportable milling machine for operations on turbine rotors and castings. Craven .....	268
Transque machine. The .....	1296
Travers Metal Products, Ltd.: .....	151
Stretch-wrap forming machines .....	1324
Trend Electronics, Ltd.: .....	148
Logic card assemblies .....	910
Trepanning holes in pipes. Wallace 4000 series Hole-Master for .....	186
Trepel (U.K.), Ltd.: .....	823
Geco type SP hydraulic straightening press .....	196
Tri-Leva arrangement for selecting spindle speeds. Myford lathe with .....	197
Triclamp tube clamps .....	1281
Triple Twelve bandsawing machine. Alexander .....	686
Troisk 3623 electrolytic diamond tool grinder .....	553
Troitsk type 4723 spark-erosion die-sinking machine .....	158
Trojan Engineering, Ltd.: .....	1379
Automatic special-purpose drilling machine .....	1222
Trolley. Enox No. 50 tool .....	320
Truck. Collis hand-controlled stillage .....	1274
Truck. E.M.I. Robotug driverless .....	1245
Truck. "Power Lifts" fork-lift .....	1320
Truck. Walkie pedestrian-controlled fork-lift .....	817,898
True position tolerances for fasteners .....	473
True-Trace hydraulic tracer head incorporated in Rambaudi Ramcop-3D copy milling machine .....	924
True-Trace Mark 50 copying equipment. Contour turning on lathes equipped with .....	473
Try-Deta programme-controlled milling machines .....	1376
Try European Machines, Ltd.: .....	695
Exhibits at London International Engineering and Marine Exhibition .....	186
See also .....	304
Tube bending machine. Carver air-operated .....	412
Tube bending mandrel. Roberts .....	1436
Tube clamps. Triclamp .....	917
Tube couplings. Miller-Betabite high-pressure .....	614
Tube drilling machine. Automatic, with simple programming system .....	258
Tube. Handling 8-ft. long "bundles" of copper/steel .....	258
Tube Investments, Ltd.: .....	15
Exhibits at London International Engineering and Marine Exhibition .....	1201
Films on Billet Grinding and Forging .....	1416
Hot-piercing tubes by a 3-roll technique .....	771
Tube-piercing technique. A new .....	598
Tube-straightening machine. Bronx high-speed .....	1042
Tube welds. Eddy current inspection of .....	923
Tubes. drilling holes in, Meddings machine .....	1324
for .....	375
Tubes. Howco-Fin finned. Arrangements for production overseas of .....	88
Tubes. Howco-Fin finned, for oil refinery .....	993
Tubes, Ltd.: .....	64
Installation of new heat-treatment furnace for steel tubes .....	773,899
Tubes. pointing, Wecker hydraulic press for .....	719
Tubes. Preparing, for welded Y-junctions .....	487
Tubing. Automatic inspection of seam-welded .....	40
Tubing. Plastics-covered lightweight steel .....	947
Tufnol, Ltd.: .....	993
Exhibits at London International Engineering and Marine Exhibition .....	64
Turner, Henry, (Machine Tools) Ltd.: .....	947
Demonstration week .....	947
Measurement of involute gears .....	773,899
Turbine rotors and castings. Craven .....	719
Transportable milling machine for operations on .....	487
Turbulence amplifiers. Design, characteristics and production of .....	40
Turbulence amplifier for fluid logic control equipment. New Maxam .....	947
Turner, Henry, (Machine Tools) Ltd.: .....	947
Demonstration week .....	947

	PAGE
Turning and boring machines. Evolutionary changes in design of large vertical .....	1024
Turning and boring mill. Gottwaldov type SKJ 10 numerically-controlled vertical .....	245
Turning, contour, under tracer control. Advantages of .....	817,898
Turning, facing and boring machine. Wywetic .....	261
Turning operations on rocker shaft components. Linked-line for .....	752
Turning tool for copying operations. Sandvik .....	215
Turning tools. Herbert-BSA throw-away tip .....	550
Turret head machine, Workmaster, with automatic positioning table .....	410
20th Century Machine Co.: .....	132
Copy-machining operations on a complex thin-valled component .....	1323
"Twist Off" for rusted nuts and bolts .....	201
Tyre mould spark-erosion machine. Russian type MA 4729 .....	201
<b>U</b>	
UCON quenchant A quenching medium .....	374
U.K.A.E.A. equipment for eddy current inspection of tube welds .....	1201
U.S. machine tool exports 163,385,554,1118,1280 .....	1167
USA market. The BEMAC report on the .....	1167
Udal, J.P., Ltd.: .....	630
Photo-electric guarding system for press brakes .....	809
Presentation of 20-ton power press with safety guard to Birmingham Industrial Safety Centre .....	1368
Uddex clamped-tip toolholder .....	1368
Udyette Corp.: .....	1301
Dur-Ni plating process improves corrosion resistance .....	1301
Ultra Electronics, Ltd.: .....	1316
Installation of Dazor type M 309 floating magnifier .....	1101
Ultra-Precise precision rotary and indexing tables. Moore .....	195
Ultrasonic and electrolytic die-sinking machine. Russian type 4b 772 combined .....	858
Ultrasonic equipment for cleaning electric assemblies. Dawe .....	95
Ultrasonic hardness testing machine. Dawe type 1851 .....	749
Ultrasonic machining equipment. Dawe type 1138A .....	599
Underbody. Hall multiple-weld transfer line for the Viva .....	17
Unit-Slide series SD pull-down broaching machines. Colonial .....	720
Unimate robot manipulator. GKN .....	765,527,1373
Unimate Engineers, Ltd. ....	179
Unimation, Inc.: .....	720
Industrial robots .....	374
See also .....	1329
Union Carbide, Ltd.: .....	639
Alloys Divn. Superalloy Dept.: .....	41
New porous metals .....	428
Unit construction. Czechoslovak type W9 horizontal boring and milling machines of .....	536
Unit-construction milling machine. Hungarian type MIV-4-21 .....	996
Unit die system. The DME standard and .....	1406
Unit head machine. Cross centre-column .....	1419
Unit press tools. Gold Star .....	349
Unit tooling. Recent additions to the Purcof range of .....	1406
Unit-type grinder with automatic work handling equipment. Newall .....	1419
Units. Tangram machine tool .....	349
United Aircraft Corporation: .....	140
Hamilton Standard Divn.: .....	140
Developments in electron-beam welding .....	140
United Kingdom Atomic Energy Authority: .....	1201
Equipment for eddy current inspection of tube welds .....	800
Univac fluid logic computer .....	603
Utilization of cylindrical grinding machines .....	603

## V

Vacu-Blast, Ltd.: .....	257
Glass bead blast rooms .....	1000
Vacuum chuck. A simple .....	520
Vacuum cleaner. B.V.C. portable industrial .....	520

	PAGE
Vacuum degassed steels. Experiences with ..	690
Vacuum flask installation. Bader .....	1306
Valacky, J.: Central and side gating systems for pressure die casting .....	930,1388
Sand castings and gravity die castings re-designed for pressure casting .....	422
Valente-Modco A.G.: Exhibits at London International Engineering and Marine Exhibition .....	1377
Valeron Corp.: Cutters and tooling systems incorporating throw-away tips .....	1377
Valley Products (Lye), Ltd.: Elevator and hopper unit .....	353
Valve actuator. Limitorque Zero Four electric .....	70
Valve. Bellows Valvair 3-way solenoid .....	1352
Valve. Davis impulse relay .....	303
Valve. Desoutter Lang solenoid spool .....	303
Valve. Dewrance Asco miniature solenoid .....	34
Valve. Dewrance type 8345 .....	721
Valve. Hamilton Pneumaid pneumatic .....	373
Valve made from PTFE. Klinger .....	912
Valve. Martonair push button-operated stop Valve production. Applications of gun reaming in .....	1295
Valve. Radio, assembly mechanization .....	689
Valve. Towler profiling and exhaust .....	101
Valve. Vickers-Detroit miniature solenoid-operated hydraulic .....	1371
Valves. Baldwin .....	37
Valves. Bellows Valvair high-flow spool .....	34
Valves. I.V. pneumatic spool .....	762
Valves. New "Air Automation" control .....	761
Vapour degassing unit. Karl Roll .....	1372
Varatop-Strateline Gears, Ltd.: 75-speed gearbox .....	1264
Vari-Set tooling system. Valente .....	1167
Vaughan Associates, Ltd. ....	1377
Vaughan-Renault Machine Tools, Ltd.: Miniline transfer machine for operations on diesel-engine cross-heads .....	262,1096
The Transquaque machine .....	364,557
Vauxhall Motors, Ltd.: Installation of Hall multiple-weld transfer line for the Viva underbody .....	268
Installation of Stuart Davis special duplex boring machine .....	599
Installation of Vitool centre-column transfer machine .....	39
Velocity control, Open-loop, for machine tool applications .....	307
Verdict Gauge (Sales), Ltd.: Extensions to premises .....	1155
Verigraph graph paper .....	1331
Vero Machine Tool Co., Ltd.: Quick-change work pistons for Autodril n.c. drilling machine .....	432
15/24-1000 series n.c. turret machining centre .....	145
Turret-type n.c. drilling machine with two spindle heads .....	162
What is a machining centre? .....	22
Versa-Trace copying equipment on a Swift type 25DR roll-turning lathe .....	495
Versatran industrial robots. Applications of Versatran manufacture licence agreement .....	1142
Verso speed reducer. Holroyd 2 5/8-in. centre .....	179
Verticalautos. Order from Leyland for 12 Ryder No. 8 .....	216
Verimat rotary indexing transfer machine .....	377
Verimat rotary transfer machine .....	611
Demonstration of .....	1162
Vibraswitch for protection of machinery .....	1435
Vibration monitoring equipment. Dawe .....	127
Vibration technologies. Developments in .....	465
Vibratory deburring and finishing .....	59
Vibratory equipment for separating investment castings from moulds and runners .....	1139
Vice, "Air Automation" type D600 air-operated, and air/hydraulic intensifier unit .....	1020
Vice. Headland Stayrite patented precision Vice. Lee universal bench .....	1050
Vices. standard machine, Work holding fixture incorporating .....	912
Vickers hardness tests on curved surfaces. Correction factors for .....	1269
Vickers, Ltd., Engineering Group: Metric/inch dial unit .....	587,773
Vickers Sperry Rand, Ltd.: Vickers-Detroit miniature solenoid-operated hydraulic valve .....	32
See also .....	37
Vitool, Ltd.: Centre-column transfer machine .....	1326
Viva underbody. Hall multiple-weld transfer line for the .....	307
	599

## Vokes, Ltd.:

Exhibits at London International Engineering and Marine Exhibition .....	860
Vollmer Werke Maschinenfabrik G.m.b.H.: Type CnK automatic saw sharpening machine .....	697
Volstatic Speedspray electrostatic paint spraying equipment .....	21
Voronzh MEY electro-magnetic forming machine .....	417

## W

WASP system. The Harwell .....	128
W.D.S. Tooling Aids, Ltd.: Standard parts for jigs and fixtures .....	401
Walker Crosswell & Co., Ltd.: Improved research and production facilities .....	1401
Walke pedestrian-controlled fork-lift truck .....	1274
Wallace, John, Mechanical Handling, Ltd.: New products .....	1222
Wallace Supplies Mfg. Co.: 4000 series Hole-Master .....	1324
Raised-hub cut-off wheels for portable grinders .....	400
Wallwork Gears, Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	855
Waltec Machine Tools, Ltd.: Bed-type production milling machine .....	881
Walters, R., C.Eng., A.M.I.Mech.E.: Electro-hydraulic pulsed control system Open-loop velocity control for machine tool applications .....	829
Ward, Thos. W., Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	1155
Warner Electric Brake & Clutch Co.: Stock automation units for modernizing existing equipment .....	24
Warner & Swayse n.c. chucking automatics. Productivity and profits increased with .....	85
Warner Swayse Asquith, Ltd.: Chucking automatic with multi-spindle drilling heads .....	1104
Washer-forming machine. Smeralovy type THP 18 .....	642
Watches. Poljot wrist, Production of cases for Water "cutter" .....	1236
Water trough "conveyor" for wax patterns .....	549
Waterbury Farrel PC transfer presses .....	1018
Watlow Electric Manuf. Co.: Electric heating elements .....	533
Watson, Manasty & Co., Ltd.: The place for optical gauging in modern manufacture .....	541
Watt, G.A.: Timesaver lapping compounds .....	574
Watts, J.L., C.Eng., A.M.I.E.E.: Variable-speed motors with thyristor control .....	607
Watts, William, Ltd.: Wave-guide built up from copper sections. Disc-loaded .....	60
Wave-injection machine, Rotary-table, for investment casting patterns .....	944
Wax-injection machine, Rotary-table, for investment casting patterns .....	1017
Wax patterns for small-quantity investment casting. Rubber dies for .....	635
Weatherley Cincinnati vertical broaching machine for operations on rocker shaft components .....	755
Webster & Bennett, Ltd.: Installation of PDQ marking-out unit .....	657
Wecker, Usines de, S.a.r.l.: Hydraulic press for pointing tubes .....	923
Wedglink belting. Brammer .....	1209
Wedge portable steam cleaner .....	1364
Weile, KG: Film: Lathe production .....	49
Type FHP 600 production milling machine .....	696
Weisser, Eugen, & Co. KG: Hektor lathe equipped for automatic copy turning .....	1263
Welbourn, D.B., M.A., M.I.Mech.E., F.I.E.E.: Optimum feed rates in shaping spur gears .....	1404
Weld-fabricated machine tool structures .....	741
Weld, multiple, transfer line for the Viva underbody. Hall .....	599
Weldall & Assembly, Ltd.: 1000-ton cold forming hydraulic press .....	329
Welded Y-junctions. Preparing tubes for .....	1324
Welder. CVE electron beam .....	882
Welder. Hayter Mighty Midget 250D trans. portable diesel-engined .....	867
Welding applications. British Federal timer for .....	102

Welding applications. Murex type 77/05 positioning unit for .....	869
Welding. Electro-slag, of forgings .....	1209
Welding. electron-beam, Developments in .....	140
Welding equipment. Cycatron Mark 2 capacitor-discharge stud .....	872
Welding equipment. Landis Machine-Maiden "Portable" 10 transportable spot .....	997
Welding equipment. Lincoln Super-Sprite semi-automatic CO <sub>2</sub> .....	928
Welding equipment. PEGO .....	927
Welding equipment. SIF Gasmatic type 175 MIG .....	927
Welding Exhibition. International .....	864,926,997
Welding gun. A.R.O. type 527 air-operated portable spot .....	870
Welding gun. Poke Gun .....	926
Welding. Interlas equipment for fine wire .....	1221
Welding machine. BISRA semi-automatic fine wire .....	1305
Welding machine. British Federal d.c. seam .....	868
Welding machine for production of scaffolding props. Automatic .....	1035
Welding machine. KSM Autoweld arc stud .....	929
Welding machine. Portable arc .....	252
Welding machine. Rowland friction .....	865
Welding machine. Sciaky type CV2 electron beam, with medium-vacuum work chamber .....	1099
Welding technique for light gauge steel. A new .....	1403
Welding of titanium bellows assemblies. Avica machine for orbital arc .....	929
Welding torch. Max Arc type TR 200 CO <sub>2</sub> .....	927
Welding tubing. Set-up for seam, with Delapena induction heating equipment .....	864
Welding unit. Rubery Owen type K225 portable flash butt .....	1000
Welding wire. Miller constant potential rectifier for fine .....	998
Welwyn Tool Co., Ltd. ....	1438
Werner, Fritz: Type FV 2D programme-controlled vertical milling machine .....	491
Type VF 1.5 vertical milling machine .....	491
Wessex Machine Tools, Ltd.: Billet sawing machine .....	691
West Lake drilling machine. Chinese-built .....	1047
West Midlands Gas Board: Industrial equipment for firing by natural gas .....	949
Westclox Divn. of General Time, Ltd.: Automatic sub-assembly .....	99
Westeria Alltrans portable conveyor .....	1273
Western Electric Co.: Automatic flash removal from plastics parts .....	76
Westinghouse Electric Corp.: Deburring condenser plates by brushing .....	134
Westinghouse Electric International S.A. ....	540
Westinghouse Marine Division non-destructive testing facilities .....	516
Westminster Engineering Co., Ltd.: Exhibits at International Welding Exhibition .....	872
Westwind Turbines, Ltd.: Exhibits at London International Engineering and Marine Exhibition .....	914
Self-feeding drilling units .....	91
Wet blasting equipment. Roto-Finish Osroblast .....	469
Wheels. arborless, Grinding at very high speeds with .....	65
Wheels for portable grinders. Wallace raised-hub cut-off .....	400
Wheels for roll grinding. New Norton .....	702
Whitaker, Vernon .....	540
Wickman, Ltd.: "10-spindle" automatic .....	1143
Wickman Wimet, Ltd.: Econolock clamped-tip tooling .....	1062
Econolock form tool .....	1080
Formlock tooling .....	1080
Wild Barfield, Ltd.: New contract heat-treatment shop .....	1005
Willis, D.L.F.: Are you making effective use of your automatics? .....	546
Wimet Econolock clamped-tip tooling .....	1062
Wimet Econolock form tool .....	1080
Wimet Formlock tooling .....	1080
Windmill thrust bearing - oldest rolling bearing in Britain .....	552
Windscreens. Stretch-wrap machine for forming frames for motor car. ....	1296
Winslow Product Engineering Corp.: Miniature automatic machine for pointing small drills .....	1365
Wire netting production. Drawaba machine for .....	797
Wire spark-erosion machines. Russian .....	192
Wire spooling machine. Drawaba .....	1046
Wire welding. Interlas equipment for fine .....	1221

	PAGE
Wire welding machine. BISRA semi-automatic fine	1305
Wire welding. Miller constant potential rectifier for fine	998
Wocafix carbide-deposition equipment	1046
Woden Automation, Ltd.	541
Woods, Peter F.: A new welding technique for light gauge steel	1403
Worcester 25-ton ungeared power press. Jones & Attwood	847
Work/assembly benches. Randalrak	1332
Work clamp. Andrews	142
Work-handling on a Conomatic 6-spindle chucking automatic. Automatic	362
Work-handling equipment for I.C. engine assembly	794
Work-handling equipment. Newall unit-type grinder with automatic	1419
Work-handling equipment. sequence-controlled, Kearney & Trecker-C.V.A. special milling machine with	236
Work-handling units. Versatile automatic	283
Work-holding arrangements for n.c. machines. Simple	874
Work-holding fixture for production milling machine. Hardress	1160
Work-holding fixture incorporating standard machine vices	1421

	PAGE
Work platens, Quick-change, for the Vero Autodrive n.c. drilling machine	145
Work shuttle equipment. Davis drill feed and automatic	1164
Work supports for engine assembly. Adjustable	455
Workmaster turret head machine with automatic positioning table	410
Workshop Analysis and Scheduling Programme. The Harwell	128
Worthington Corporation: Use of diamond tools for machining hard rubber components	692
Wyss, Rene: Reamers and counterbores	1146
Wyvern Machines, Ltd.: Wyvertic turning, facing and boring machine	261

# Y

	PAGE
Young, John S., & Co. (Sales) Ltd.: Machine tool exhibition	1064
Young, M.L.: Die casting die sprue and runner design	1425

	PAGE
Youngman, W.C., Ltd.: Wedgo portable steam cleaner	1364

# Z

	PAGE
ZDAS type LVH 2500-ton screw-type forging press	645
Z.I. Likhachev Automobile Plant: Production of motor car engine components	788
Zeiss, VEB Carl: Equipment for measuring linear slide movements on Zerbst facing lathe	547
Gear testing instruments	358
Mechanical base pitch tester for use on spur and helical gears	549
Metrology symposium	357
P.1 universal measuring microscope	357
Trapezoidal-section glass scales	884
Zerbst, VEB Werkzeugmaschinenfabrik: Type DP 630 Num. numerically-controlled facing lathe	547, 982
Zero Four electric valve actuator. Limitorque	70
Zircon sand. Advantages of shell-mould casting with	1302





